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THE MAMMALS OF NORTHEASTERN BRAZIL: A PRELIMINARY ASSESSMENT

MICHAEL A. MARES¹

Research Associate, Section of Mammals

MICHAEL R. WILLIG¹

KARL E. STREILEIN¹

THOMAS E. LACHER, JR.¹

ABSTRACT

Mammals were collected in northeastern Brazil between 1975 and 1978. Research was concentrated in the State of Pernambuco in the environs of the Municipality of Exu and in the State of Ceará, in the Municipality of Crato. Additionally, a representative sample of mammals collected throughout the Caatingas and housed in the National Museum in Rio de Janeiro and the Museum of Zoology of the University of São Paulo was examined. Distributional data as well as ecological notes are presented in this preliminary report. Major collecting localities are also described.

INTRODUCTION

Background

In 1974, initial efforts were made to examine various aspects of mammalian biology in the semiarid Caatingas of northeastern Brazil. This area is of particular interest because it is an extensive tropical

¹ Address: Department of Biological Sciences, University of Pittsburgh, Pittsburgh, PA 15260, and Pymatuning Laboratory of Ecology, Linesville, PA 16424.
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pocket of aridity bordered by more mesic habitat and may be important from a biogeographic perspective (Müller, 1973). Although the Caatingas has long played an important role in the culture and economy of Brazil (see for example James, 1942), the region has not been well studied, particularly from the point of view of its mammal fauna. Further, the entire region is greatly affected by human activities (agriculture, ranching, hunting), making it imperative to examine the area as soon as possible. Despite its broad extent and unique climate, previous studies have found that the Caatingas does not support significant numbers of endemic bird species (Sick, 1965) or lizards (Vanzolini, 1974). In this report we give a preliminary accounting of the mammals of the Caatingas, particularly those inhabiting the geographical center of the region near Exu, Pernambuco, and Crato, Ceará. We also include habitat descriptions and ecological notes on several species.

Objectives

The major objective of our research was to examine the distribution and ecology of the mammals of the Caatingas. Although we originally intended to continue the field research beyond 1978, difficulties in funding ended field work in May of that year. During the two years of greatest activity (1976–78), we were able to examine the mammal fauna of the environs of the Municipality of Exu in some detail. We were also able to initiate detailed treatments of the behavioral ecology of *Kerodon rupestris*; the habitat selection and interspecific aggression of *Thrichomys apereoides*, *Galea spixii*, *Monodelphis domestica*, and *Didelphis albiventris*; and the community ecology and reproductive biology of the bat faunas of habitats supporting Caatingas and Cerrado vegetation. Finally, we hope to be able to clarify various taxonomic problems concerning Caatingas species, as well as to offer new data on the distribution and natural history of many species of mammals from this largely unstudied region. This preliminary report on the mammals of the Northeast will be a forerunner of more extensive faunal analyses which will appear as the final preparation of specimens is completed.

Personnel

The primary field researchers involved in this study were Michael R. Willig, Karl E. Strelein, and Thomas E. Lacher, Jr. In addition, some specimens were collected by Michael A. Mares, and all of the above examined various localities throughout much of the Caatingas. Employees of AGGEU, under the direction of Celio Rodrigues de Almeida, occasionally provided specimens collected from the Municipality of Exu. Several specimens were collected by Alfred L. Gardner during a visit to Exu. Finally, some specimens were collected by Laurie J. Vitt. The project was coordinated by Mares, and at least one full-time field assistant was available for each investigator.

Collections

Most of our collecting was done in the immediate area of the Municipality of Exu, Pernambuco, and the Municipality of Crato, Ceará, particularly on the Chapada do Araripe. Occasional collecting trips were made to other areas, but in comparison with the work performed in the Exu-Crato area, these were minor in scope. In order to obtain a better idea of mammal distribution patterns in the Caatingas, we examined the extensive collection of Caatingas mammals housed in the National Museum of Rio de Janeiro and the Museum of Zoology of the University of São Paulo. We also attempted to collect specimens in most of the major macrohabitats of the Northeast. The Northeast of Brazil contains five principal vegetation zones including: Rainforest along the Atlantic coast, Cerrado, Caatingas, Cerrado-Caatingas contact zone, and Palm Forest. We were able to do some collecting in each of these regions, but our samples are far from adequate to arrive at a definitive faunal assessment for any region.

During this study, 6576 mammal specimens representing seven orders, 21 families, 56 genera, and 74 species were collected. An additional 630 specimens representing four orders, six families, 16 genera, and 17 species were examined in museum collections. Upon completion of museum specimen processing, half of our collection will be housed in the Zoology Museum of the University of São Paulo and half will be housed in the Carnegie Museum of Natural History, Pittsburgh, Pennsylvania.

A complete list of species, including those observed but not captured, is as follows:

Order Marsupialia

Family Didelphidae

- Monodelphis domestica*
- Marmosa cinerea*
- Marmosa karimii*
- Didelphis albiventris*

Order Chiroptera

Family Emballonuridae

- Saccopteryx bilineata*
- Saccopteryx leptura*
- Pteropteryx macrotis*

Family Noctilionidae

- Noctilio leporinus*

Family Mormoopidae

- Pteronotus davyi*
- Pteronotus parnellii*
- Pteronotus personatus*

Family Phyllostomatidae

Subfamily Phyllostomatinae

- Micronycteris minuta*
- Micronycteris* sp.
- Lonchorhina aurita*
- Tonatia bidens*
- Tonatia brasiliense*
- Mimon crenulatum*
- Phyllostomus discolor*
- Phyllostomus hastatus*
- Trachops cirrhosus*

Subfamily Glossophaginae

- Glossophaga soricina*
- Lonchophylla mordax*
- Anoura geoffroyi*

Subfamily Carolliinae

- Carollia perspicillata*

Subfamily Sturnirinae

- Sturnira lilium*

Subfamily Stenoderminae

- Uroderma bilobatum*
- Uroderma magnirostrum*
- Vampyrops lineatus*
- Artibeus cinereus*
- Artibeus concolor*
- Artibeus fuliginosus*
- Artibeus jamaicensis*
- Artibeus lituratus*

Subfamily Desmodontinae

- Desmodus rotundus*
- Diaemus youngii*
- Diphylla ecaudata*

Family Natalidae

- Natalus stramineus*

Family Furipteridae

- Furipterus horrens*

Family Vespertilionidae

- Myotis nigricans*
- Eptesicus furinalis*

- Rhogeessa tumida*
Lasiurus borealis
Lasiurus ega
 Family Molossidae
Molossops abrasus
Molossops greenhalli
Molossops planirostris
Molossops temminckii
Neoplatymops mattogrossensis
Tadarida laticaudata
Tadarida sp.
Eumops sp.
Molossus ater
Molossus molossus
Promops sp.
- Order Primates
 Family Cebidae
Cebus apella
 Family Callithricidae
Callithrix jacchus
- Order Edentata
 Family Myrmecophagidae
Tamandua tetradactyla
 Family Dasypodidae
Euphractus sexcinctus
Dasypus novemcinctus
- Order Lagomorpha
 Family Leporidae
Sylvilagus brasiliensis
- Order Rodentia
 Family Muridae
 Subfamily Cricetinae
Oryzomys eliurus
Oryzomys subflavus
- Rhipidomys mastacalis*
Akodon sp.
Akodon arviculoides
Bolomys lasiurus
Oxymycteris angularis
Calomys callosus
Calomys sp.
Wiedomys pyrrhorhinos
Holochilus brasiliensis
 Subfamily Murinae
Rattus rattus
Mus musculus
 Family Caviidae
Kerodon rupestris
Galea spixii
 Family Dasyproctidae
Dasyprocta prymnolopha
 Family Echimyidae
Proechimys sp.
Thrichomys apereoides
- Order Carnivora
 Family Canidae
Cerdocyon thous
 Family Procyonidae
Procyon cancrivorus
 Family Mustelidae
Galictis vittata
Conepatus semistriatus
 Family Felidae
Felis concolor
Felis onca
Felis yagouaroundi
- Order Artiodactyla
 Family Cervidae
Mazama gouazoubira

Description of Study Sites

The Caatingas is a vast semiarid region of northeastern Brazil (Fig. 1), occurring between approximately 35° and 45° west longitude and 3° and 16° south latitude (Reis, 1976). The area encompasses about 650,000 km² (Frota-Pessoa et al., 1971), or about 10% of the territory of Brazil (Reis, 1976). The region is rather anomalous in that it is the largest dry region contained within the tropics and is bordered by much more mesic habitats.

The climate of the Caatingas has been extensively studied by Markham (1972; see also Markham and McLain, 1977). Most of the Caatingas receives less than 500 mm of precipitation per year, although some areas receive more than 1600 mm of rain per year. The whole region is subject to unpredictable periods of aridity when rainfall over large areas will not exceed 200 mm per year. This has given the Caatingas the name Polygon of Drought (for example, Frota-Pessoa et al., 1971), and the effects of the periodic extreme aridity on the human populace are pronounced (James, 1942), particularly in localities in which annual rainfall plummets to zero for an entire year. Gener-

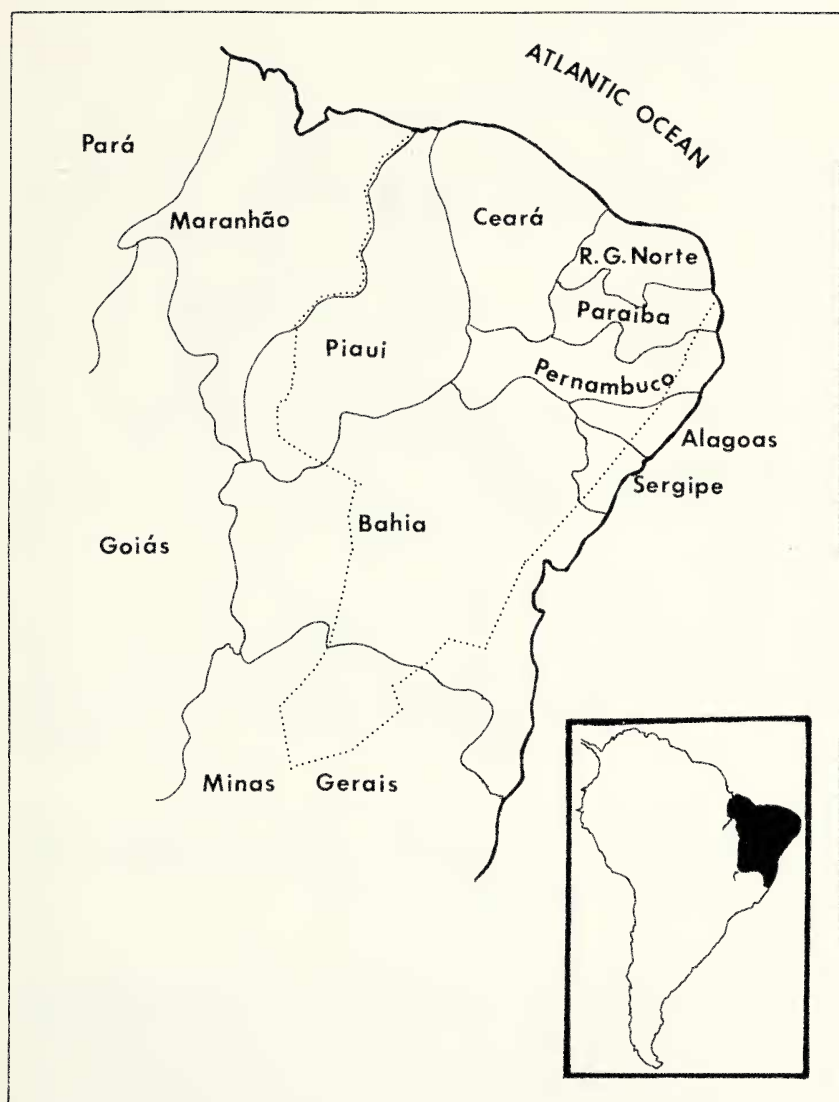


Fig. 1.—The Caatingas of Brazil (area enclosed by the dotted line) occupies an area of 650,000 km², contained for the most part in the nine states of the Northeast.

ally, most rainfall over much of the Caatingas falls between December and April or May, with showers commencing in October (James, 1942). In particularly wet years, there may be no drought period at all, although usually each year contains at least several months with little or no precipitation when deciduousness is pronounced.

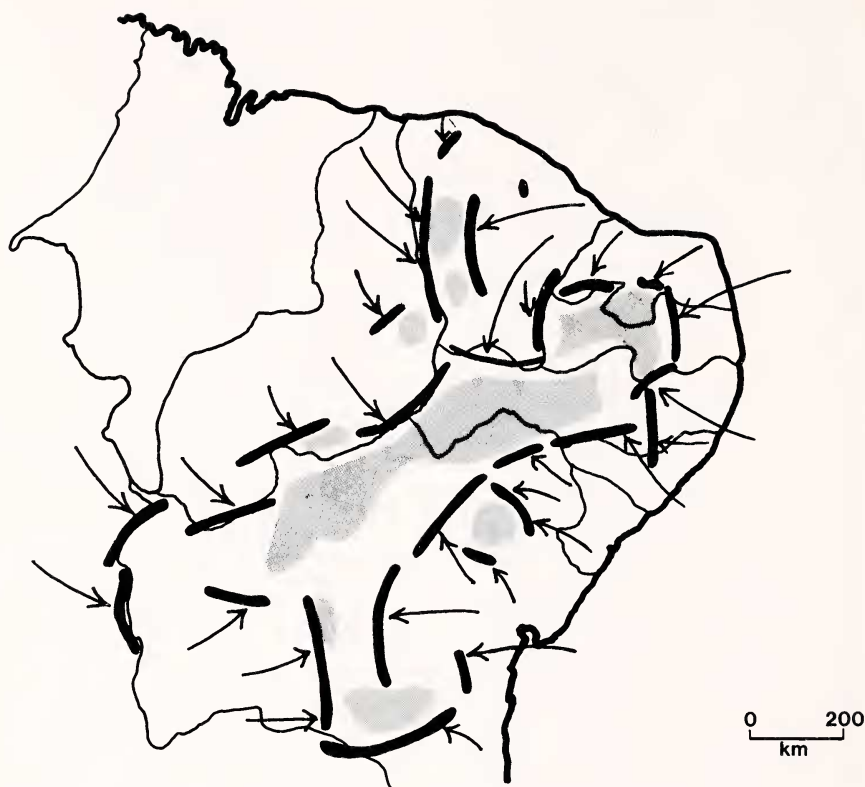


Fig. 2.—The windward side of large chapadas and serrates (indicated by thick black lines) receive appreciable amounts of orographic rainfall due to the adiabatic cooling of rising air currents (arrows). This in turn produces a rain shadow (shaded area) throughout the interior of the Northeast which is unpredictably subject to periods of severe drought (Adapted from Markham, 1972).

There is marked topographic relief across the Caatingas as hills, low mountain ranges, and rocky knobs protrude above the gentle plain. These are all the result of differential erosion and provide sites of increased rainfall (orographic precipitation) due to upwelling air currents caused by the rocky barriers (Fig. 2). The largest of these, the Chapada do Araripe, was located within our principal collecting area and provided a mesic enclave within the overall semiarid region. Because of the effect of the Chapada do Araripe and other associated rocky hills, the Exu-Crato region provides a large diversity of habitat types, varying from very dry localities to quite mesic sites; vegetation on these sites varies in accordance with precipitation and is described below (Fig. 3). During the period of intensive study (1976–78), the Exu-Crato region experienced two years of high precipitation without a well-delineated drought period. The vegetation during this time did not undergo pronounced deciduousness.

A description of each collecting locality and a faunal list for each area follow.

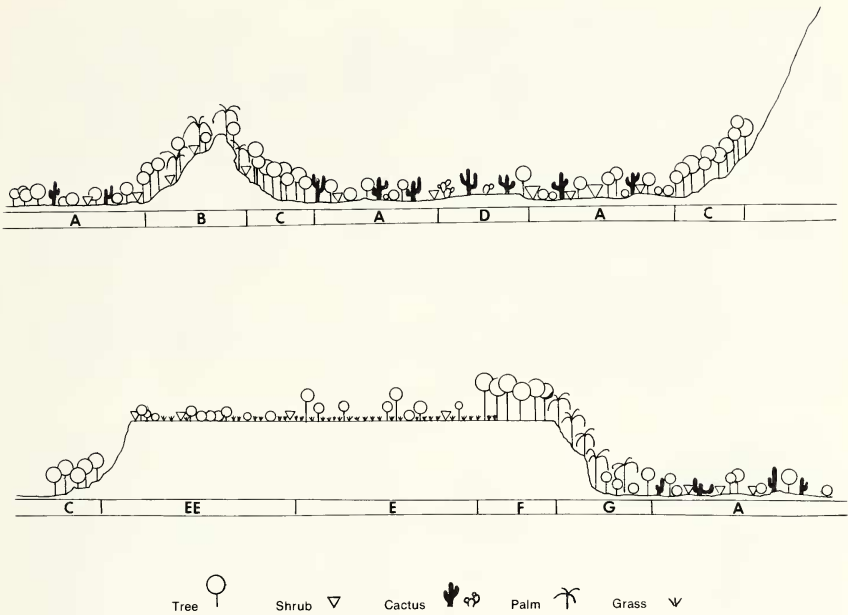


Fig. 3.—Graphic representation (adapted from Willig, unpublished manuscript) of the mosaic of habitats in the Caatingas and their proximity to cerrado vegetation on the Chapada do Araripe and to humid forest in areas of orographic rainfall. Key to habitat types—A, Caatinga Baixa; B, Serrote; C, Caatinga Alta; D, Lajeiro; E, Cerrado; EE, Disturbed areas of Cerrado; F, Cerradão; G, Humid Forest.

Table 1.—Common plants of Caatinga Baixa habitats in the Município de Exu, Pernambuco.

Species	Family
<i>Cassia excelsa</i>	Leguminosae
<i>Cereus jamacaru</i>	Cactaceae
<i>Cnidoscolus urens</i>	Euphorbiaceae
<i>Cordia globosa</i>	Boraginaceae
<i>Croton campestris</i>	Euphorbiaceae
<i>Croton jacobinensis</i>	Euphorbiaceae
<i>Phaseolus peduncularis</i>	Leguminosae, Papilionaceae
<i>Piptadenia</i> sp.	Leguminosae, Mimosoideae
<i>Piptadenia zehntneri</i>	Leguminosae, Mimosoideae
<i>Ziziphus joazeiro</i>	Rhamnaceae

I. The Remnant Atlantic Rain Forest

A short time (5 days) was spent making a preliminary survey of the mammal fauna of the Estação Ecológica do Tapacurá, located west of Recife, Pernambuco. This area is contained within the zone of what was previously dominated by the Atlantic Rain Forest; today it is limited to only the small patches of the original vegetation which have escaped destruction (compare James, 1942; Frota-Pessoa et al., 1971). Most of the region supports sugar cane or other crops and orchards; the effect of agricultural activities on the present-day remnants of the forest fauna are unknown.

The Atlantic Rain Forest is characterized by a high diversity of mesophytic broadleaved trees. Although the canopy may reach a height of 35 m, it rarely exceeds 25 m. Within the rainforest, ground cover is sparse and vines often form complex networks from ground level through the canopy.

A list of mammal species either collected or sighted follows. For this and other localities, we have included a subjective assessment of abundance, with U = unknown, R = rare, C = common, and A = abundant.

<i>Monodelphis domestica</i>	(U)	<i>Artibeus lituratus</i>	(U)
<i>Didelphis albiventris</i>	(U)	<i>Desmodus rotundus</i>	(U)
<i>Peropteryx macrotis</i>	(U)	<i>Diaemus youngii</i>	(U)
<i>Micronycteris minuta</i>	(U)	<i>Myotis nigricans</i>	(U)
<i>Phyllostomus hastatus</i>	(U)	<i>Lasiurus borealis</i>	(U)
<i>Glossophaga soricina</i>	(U)	<i>Molossops greenhalli</i>	(U)
<i>Carollia perspicillata</i>	(U)	<i>Akodon</i> sp.	(U)
<i>Sturnira lilium</i>	(U)	<i>Galea spixii</i>	(U)
<i>Artibeus cinereus</i>	(U)	<i>Thrichomys apereoides</i>	(U)
<i>Artibeus jamaicensis</i>	(U)		

II. Caatingas

The semiarid region of anomalous drought in the Northeast of Brazil encompasses a wide range of plant communities which are collectively known as Caatingas (Fig. 3). In general, Caatingas are assemblages of xeric-adapted plants, however, these communities need not be dominated by members of the Cactaceae.

Caatinga Baixa.—Throughout the lower elevations in Pernambuco and parts of Ceará and Bahia, Caatinga Baixa, or Low Caatinga communities predominate. Although the species composition may shift considerably between widely separated localities, trees are generally xerophytic and reach a height of 3 to 5 m with occasional emergents reaching a height of 8 m. Large cacti, such as *Cereus jamacaru* (Mandacaru), *Cephalocereus gounellei* (Xique-Xique), and *Zehnerella squamulosa* (Facheiro), are common components in Low Caatinga communities (Figs. 4 and 5). Substantial variation in the types of vegetation within a single locality is the rule rather than the exception in Caatinga Baixa. Minor differences in topography, variation in soil parameters, prior utilization by man, and differential exploitation by domestic animals are among the primary factors which generate the characteristic microhabitat mosaics. This complex of microhabitats is often too diverse to be easily categorized with a few broad generalizations. Some of the more common plants in Caatinga Baixa are listed in Table 1. The mammals of Caatinga Baixa are as follows:

<i>Monodelphis domestica</i>	(C)	<i>Rhogeessa tumida</i>	(U)
<i>Marmosa karimii</i>	(R)	<i>Lasiurus ega</i>	(R)
<i>Didelphis albiventris</i>	(C)	<i>Molossus ater</i>	(R)
<i>Noctilio leporinus</i>	(C)	<i>Molossus molossus</i>	(R-C)
<i>Pteronotus personatus</i>	(R)	<i>Callithrix jacchus</i>	(R)
<i>Trachops cirrhosus</i>	(R)	<i>Dasypus novemcinctus</i>	(C)
<i>Glossophaga soricina</i>	(C)	<i>Euphractus sexcinctus</i>	(C)
<i>Lonchophylla mordax</i>	(C)	<i>Sylvilagus brasiliensis</i>	(U)
<i>Anoura geoffroyi</i>	(R)	<i>Calomys callosus</i>	(R)
<i>Carollia perspicillata</i>	(C)	<i>Wiedomys pyrrhorhinos</i>	(R)
<i>Uroderma bilobatum</i>	(R)	<i>Galea spixii</i>	(R)
<i>Vampyrops lineatus</i>	(C)	<i>Cerdocyon thous</i>	(C)
<i>Artibeus jamaicensis</i>	(R)	<i>Procyon cancrivorus</i>	(R)
<i>Artibeus lituratus</i>	(R)	<i>Galictis vittata</i>	(U)
<i>Desmodus rotundus</i>	(C)	<i>Conepatus semistriatus</i>	(U)
<i>Myotis nigricans</i>	(R-C)	<i>Felis yagouaroundi</i>	(U)

Caatinga Alta.—Large xerophyllic trees which annually lose their leaves in synchrony during the dry season predominate and form a closed canopy in the wet season. These trees range in size from 10 to 12 m tall and are less densely packed than trees in *Caatinga Baixa* habitats (Fig. 6). The understory is usually poorly developed, but varies greatly in both composition and density from locality to locality. *Caatinga Alta* communities are restricted to higher elevations, hillsides, or the perimeters of valleys. The common plants in these communities are listed in Table 2. Locations which support *Caatinga Alta* communities are generally more mesic than Low *Caatinga* sites, but are drier than nearby *serrotes*. Rock outcroppings are often dispersed throughout the forest floor, but they are rarely very large. A list of mammals occurring in *Caatinga Alta* is as follows:

<i>Monodelphis domestica</i>	(C)	<i>Desmodus rotundus</i>	(A)
<i>Didelphis albiventris</i>	(C)	<i>Diphylla ecaudata</i>	(R)
<i>Noctilio leporinus</i>	(C)	<i>Myotis nigricans</i>	(R-C)
<i>Pteronotus davyi</i>	(R)	<i>Molossops planirostris</i>	(R)
<i>Micronycteris minuta</i>	(R)	<i>Neoplatymops mattogrossensis</i>	(R)
<i>Micronycteris</i> sp.	(R)	<i>Molossus molossus</i>	(R-C)
<i>Tonatia bidens</i>	(C)	<i>Cebus apella</i>	(R)
<i>Tonatia brasiliense</i>	(R)	<i>Callithrix jacchus</i>	(C)
<i>Mimon crenulatum</i>	(R)	<i>Tamandua tetradactyla</i>	(R)
<i>Phyllostomus discolor</i>	(R)	<i>Euphractus sexcinctus</i>	(R)
<i>Glossophaga soricina</i>	(C-A)	<i>Dasypus prymnolopha</i>	(R)
<i>Lonchophylla mordax</i>	(C)	<i>Cerdocyon thous</i>	(C)
<i>Carollia perspicillata</i>	(C-A)	<i>Galictis vittata</i>	(U)
<i>Sturnira lilium</i>	(R)	<i>Felis yagouaroundi</i>	(U)
<i>Vampyrops lineatus</i>	(C)	<i>Felis onca</i>	(U)
<i>Artibeus jamaicensis</i>	(C)	<i>Mazama gouazoubira</i>	(R)
<i>Artibeus lituratus</i>	(R-C)		

Serrotes.—The relatively flat terrain of the *Caatingas* contains a large number of small granitic mountains known as *serrotes* (Fig. 7). These *serrotes* appear to function as mesic refugia during the dry season. Palms, such as *Syagrus oleracea* and *Accrocomia intumescens*, are typically restricted to *serrotes*. In many places, *serrotes* contain the

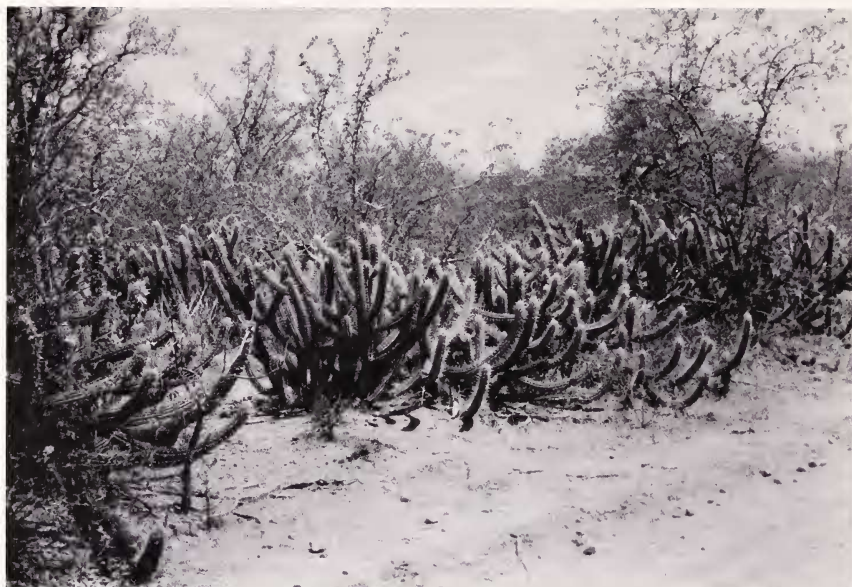


Fig. 4.—Although dense deciduous trees and shrubs form the dominant thorn scrub component of Caatinga Baixa, cacti such as Xique-Xique (shown in this photograph) are prevalent in many localities. Município de Serra Talhada, Pernambuco.



Fig. 5.—Much of the Caatingas is being altered by human activities. The effects of slash and burn agriculture (on the right of the photograph) are contrasted with the dense vegetation of Caatinga Baixa. Município de Exu, Pernambuco.



Fig. 6.—Granitic substrates (seen in the foreground) often delimit the edge of Caatinga Alta habitats at higher elevations on serrates. Notice the large trees (seen in the background) typical of Caatinga Alta vegetation. Município de Exu, Pernambuco.



Fig. 7.—A rocky serrate interrupts the flat plain of Caatinga Baixa habitat. Photograph taken during the dry season of 1975. Município de Serra Talhada, Pernambuco.



Fig. 8.—Extensive lajeiros studded with cacti (Mandacaru and Palma) and bromeliads are frequently encountered in the Caatingas. At this particular site, the top of the lajeiro is slightly elevated above the plain of the surrounding thorn scrub. Depressions and crevices on the surface often fill with water in the wet season and persist for a variable amount of time in the dry season. Município de Senhor do Bom Fim, Bahia.

upper limit of Caatinga Alta habitat; hence the vegetation of the serrotes may be considered a mixture of Caatinga Alta and more mesic elements such as palm trees. The mammals of the serrotes include the following:

<i>Monodelphis domestica</i>	(A)	<i>Artibeus lituratus</i>	(C)
<i>Didelphis albiventris</i>	(A)	<i>Desmodus rotundus</i>	(A)
<i>Peropteryx macrotis</i>	(R)	<i>Diphylla ecaudata</i>	(R)
<i>Micronycteris</i> sp.	(R)	<i>Furipterus horrens</i>	(R)
<i>Tonatia bidens</i>	(C)	<i>Myotis nigricans</i>	(R-C)
<i>Tonatia brasiliense</i>	(R)	<i>Molossops temminckii</i>	(R)
<i>Phyllostomus discolor</i>	(R)	<i>Neoplatymops mattogrossensis</i>	(R)
<i>Phyllostomus hastatus</i>	(R)	<i>Euphractus sexcinctus</i>	(R)
<i>Trachops cirrhosus</i>	(C)	<i>Kerodon rupestris</i>	(A)
<i>Glossophaga soricina</i>	(A)	<i>Thrichomys apereoides</i>	(A)
<i>Lonchophylla mordax</i>	(C)	<i>Cerdocyon thous</i>	(C)
<i>Anoura geoffroyi</i>	(R-C)	<i>Galictis vittata</i>	(C)
<i>Carollia perspicillata</i>	(A)	<i>Conepatus semistriatus</i>	(U)
<i>Vampyrops lineatus</i>	(A)	<i>Felis yagouaroundi</i>	(U)
<i>Artibeus jamaicensis</i>	(A)		

Lajeiros.—Lajeiros are rock outcroppings primarily distributed throughout low lying areas of the Caatingas. They vary in complexity from simple unbroken rock faces, to



Fig. 9.—Lajeiros composed of large boulders are also common in the Caatingas (background of photograph). The foreground is occupied by an abandoned agricultural field which is in an early successional stage of development, while the lajeiro harbors a flora more typical of Caatinga Baixa vegetation. Município de Senhor do Bom Fim, Bahia.

a complex of many fissured rock faces studded with cacti and strewn with boulders of variable sizes and shapes (Figs. 8 and 9). The predominant cacti associated with these outcroppings are *Pilosocereus gounellei*, *Cereus jamacaru*, and *Opuntia palmadora* (Palma). Most lajeiros are located near serrotes; however, some may be isolated by a distance of several kilometers from other lajeiros or serrotes. Lajeiros occupy a broad

Table 2.—Common plants of Caatinga Alta habitats in the Município de Exu, Pernambuco.

Species	Family
<i>Bauhinia</i> sp.	Leguminosae, Caesalpinioideae
<i>Cavanillesia arborea</i>	Bombacaceae
<i>Cordia</i> sp.	Boraginaceae
<i>Craetava tapia</i>	Capparaceae
<i>Croton argyrophylloides</i>	Euphorbiaceae
<i>Croton jacobinensis</i>	Euphorbiaceae
<i>Erythroxylum</i> sp.	Erythroxylaceae
<i>Piptadenia zehntneri</i>	Leguminosae, Mimosoideae
<i>Pterogyne nitens</i>	Leguminosae, Papilionoideae
<i>Schinus terebinthifolius</i>	Anacardiaceae



Fig. 10.—A planted agricultural field dominates the foreground, with characteristic Caatinga vegetation occupying steep slopes on the sides of hills (seen in the background). Município de Senhor do Bom Fim, Bahia.

range of sizes whose upper limit includes extensive formations best measured in hectares. Complex *lajeiros* greatly enhance the horizontal and vertical complexity of the Caatingas. Mammals frequenting *lajeiros* include the following:

<i>Monodelphis domestica</i>	(A)	<i>Molossops temminckii</i>	(R)
<i>Didelphis albiventris</i>	(A)	<i>Neoplatymops mattogrossensis</i>	(C)
<i>Peropteryx macrotis</i>	(R)	<i>Kerodon rupestris</i>	(A)
<i>Micronycteris</i> sp.	(R)	<i>Galea spixii</i>	(C)
<i>Glossophaga soricina</i>	(C)	<i>Trichomys apereoides</i>	(A)
<i>Carollia perspicillata</i>	(C-A)	<i>Cerdocyon thous</i>	(C)
<i>Vampyrops lineatus</i>	(C)	<i>Galictis vittata</i>	(C)

Areas dominated by human activity.—Agricultural practices have greatly altered the natural state of the Caatingas (Fig. 10). Fruit orchards may predominate in the more mesic areas, especially along streams, where a wide variety of fruits such as oranges, papayas, bananas, and mangos are cultivated.

The standard procedure for establishing an agricultural field entails clear-cutting sections of Low or High Caatinga, removing the large pieces of wood for fuel, and burning the remaining material on the site. Subsequent utilization varies, depending upon both the site and crop planted. Corn and beans are the most common and transient crops grown in Low Caatinga habitats, whereas cotton and *Opuntia* plantings may persist for years. Grass pastures also last for many years, due in part to occasional burning and constant grazing by cattle and horses, which prevent the reestablishment of Caatingas vegetation.



Ground cover is very dense and short, rarely exceeding 1 meter in height. Members of the Poaceae (*Aristida*, *Brachiaris*, *Cenchrus*, *Panicum*, and *Rhynchelytrum*) and herbs generally predominate; small shrubs, tree seedlings, and cacti are scattered throughout the area.



Ground cover continues to be well developed. Malvaceous herbs (*Gaya*, *Bogenhardia* and *Sida*) are predominant. Tree saplings, shrubs, and herbs frequently exceed a height of one meter.



Ground cover diminishes concomitantly as shrubs (particularly *Solanum* spp) and trees (typically legumes or euphorbs such as *Cassia*, *Piptadenia* or *Croton*) attain heights between two and three meters.



Ground cover is sparse due to the enlarging area shaded by the canopy. A well developed shrub component is present but rarely exceeds a height of two meters; species of the Acanthaceae (*Jacobina* and *Ruella*) are of increasing importance.



Ground cover is generally weakly developed or nonexistent. The shrub layer varies in density but is typically 1 to 3 meters high. Trees dominate the flora, the majority of them attaining a height between 3 and 5 meters. Occasional emergents exceed 5 meters in height, but these are rare.



Fig. 11.—Much of the Caatingas occurs in one of the seral stages of ecological succession graphically illustrated above. (Adapted from Willig et al., unpublished manuscript.)

Abandoned agricultural fields proceed through a number of successional stages. The amount of time during which a particular sere persists is extremely variable, primarily because vegetative growth is directly linked to the amount and timing of annual rainfall. Due to the magnitude of human activity in recent history, much of the Caatingas is in a disturbed state, existing in one of the seral stages discussed in Fig. 11. Mammals found in disturbed habitats include the following:

Buildings

<i>Monodelphis domestica</i>	(R)	<i>Tadarida laticaudata</i>	(R)
<i>Didelphis albiventris</i>	(R)	<i>Molossus ater</i>	(R)
<i>Peropteryx macrotis</i>	(R)	<i>Molossus molossus</i>	(A)
<i>Glossophaga soricina</i>	(A)	<i>Promops</i> sp.	(R)
<i>Carollia perspicillata</i>	(C)	<i>Rattus rattus</i>	(A)
<i>Myotis nigricans</i>	(C-A)	<i>Mus musculus</i>	(R)



Fig. 12.—Cerrado vegetation on the Chapada do Araripe in the Floresta Nacional Araripe-Apodí is dominated by grass and trees and is quite similar to the savanna of Africa. Município de Crato, Ceará.

Agricultural fields

<i>Monodelphis domestica</i>	(R)	<i>Oryzomys subflavus</i>	(R-C)
<i>Didelphis albiventris</i>	(R)	<i>Bolomys lasiurus</i>	(R-A)
<i>Oryzomys elurus</i>	(R)	<i>Galea spixii</i>	(A)

Fruit orchards

<i>Monodelphis domestica</i>	(R)	<i>Anoura geoffroyi</i>	(R)
<i>Didelphis albiventris</i>	(C)	<i>Carollia perspicillata</i>	(C)
<i>Phyllostomus discolor</i>	(C)	<i>Vampyrops lineatus</i>	(C)
<i>Glossophaga soricina</i>	(C)	<i>Lasiurus ega</i>	(R)

Abandoned fields

<i>Monodelphis domestica</i>	(C)	<i>Bolomys lasiurus</i>	(R-A)
<i>Marmosa karimii</i>	(R)	<i>Calomys callosus</i>	(R)
<i>Didelphis albiventris</i>	(C)	<i>Galea spixii</i>	(A)
<i>Dasyus novemcinctus</i>	(U)	<i>Cerdoyon thous</i>	(C)
<i>Euphractus sexcinctus</i>	(U)		

III. The Chapada do Araripe

The Floresta Nacional Araripe-Apodí contains most of the collection sites examined on the Chapada do Araripe. The topography of the plateau is exceedingly flat, with a thin layer of sandy red soil covering a hard sandstone substrate. Permanent bodies of



Fig. 13.—Humid forest occupies areas of orographic rainfall on the windward side of the Chapada do Araripe. Município de Crato, Ceará.

water of any size are absent from the Chapada do Araripe; during the rainy season, temporary pools of water may form in low-lying depressions. There are no rocks, boulders or even stones on the top of the Chapada. In general, the vegetation is sclerophyllous and semideciduous. Trees and shrubs may lose their leaves each year, but leaf loss is asynchronous both inter- and intraspecifically.

Cerrado.—The Cerrado of the Chapada do Araripe is physiognomically an open tree and shrub woodland with a pervasive grass component (Figs. 3 and 12). Taller trees, rarely exceeding a height of 15 m, are scattered throughout the area. Smaller trees of various sizes (3 m to 5 m) and shrubs (.5 m to 3 m) comprise about 50% of the plant

Table 3.—Common plants in Cerrado and Cerradão habitats of the Chapada do Araripe in the Floresta Nacional Araripe-Apodí.

Species	Family
<i>Annona</i> sp.	Annonaceae
<i>Byrsonima sericea</i>	Malpighiaceae
<i>Caryocar coreaceum</i>	Caryocaraceae
<i>Casearia dentata</i>	Flacourtiaceae
<i>Casearia grandiflora</i>	Flacourtiaceae
<i>Cassia speciosa</i>	Leguminosae, Caesalpinioideae
<i>Cassia splendida</i>	Leguminosae, Caesalpinioideae
<i>Dioclea bicolor</i>	Leguminosae, Papilionoideae
<i>Fagara gardneri</i>	Rutaceae
<i>Hirtela glandulosa</i>	Chrysobalanaceae
<i>Hirtela racemosa</i>	Chrysobalanaceae
<i>Hyptis umbrosa</i>	Labiatae
<i>Miconia</i> c.f. <i>albicans</i>	Melastomaceae
<i>Miconia ligustroides</i>	Melastomaceae
<i>Myrcia</i> sp.	Myrtaceae
<i>Ocotea pallida</i>	Lauraceae
<i>Parkia platicephala</i>	Leguminosae, Mimosoideae
<i>Stygmaphyllon</i>	Malpighiaceae
<i>Vismia</i>	Guttiferae

cover, while grass species occupy the remaining area. As such, the canopy is irregular and undulating in profile, with numerous areas lacking woody plants. Taller trees and shrubs often have characteristically twisted trunks and branches. The most common trees, shrubs, and grasses are noted in Table 3, while the mammals of the Cerrado portion of the Chapada do Araripe include the following:

<i>Didelphis albiventris</i>	(A)	<i>Eptesicus brasiliensis</i>	(R)
<i>Pteronotus davyi</i>	(R)	<i>Lasiurus borealis</i>	(R)
<i>Micronycteris</i> sp.	(R)	<i>Lasiurus ega</i>	(R)
<i>Micronycteris minuta</i>	(R)	<i>Molossops temminckii</i>	(R)
<i>Phyllostomus discolor</i>	(A)	<i>Molossus molossus</i>	(R-C)
<i>Phyllostomus hastatus</i>	(A)	<i>Callithrix jacchus</i>	(U)
<i>Glossophaga soricina</i>	(A)	<i>Tamandua tetradactyla</i>	(U)
<i>Anoura geoffroyi</i>	(A)	<i>Euphractus sexcinctus</i>	(A)
<i>Carollia perspicillata</i>	(A)	<i>Dasypus novemcinctus</i>	(A)
<i>Sturnira lilium</i>	(R-C)	<i>Oryzomys eliurus</i>	(R)
<i>Uroderma bilobatum</i>	(R)	<i>Bolomys lasiurus</i>	(R)
<i>Vampyrops lineatus</i>	(A)	<i>Wiedomys pyrrhorhinos</i>	(R)
<i>Artibeus concolor</i>	(R)	<i>Dasyprocta prymnolopha</i>	(U)
<i>Artibeus jamaicensis</i>	(A)	<i>Cerdocyon thous</i>	(C)
<i>Artibeus lituratus</i>	(A)	<i>Felis concolor</i>	(U)
<i>Desmodus rotundus</i>	(R)	<i>Felis onca</i>	(U)
<i>Natalus stramineus</i>	(R)	<i>Mazama gouazoubira</i>	(C)
<i>Myotis nigricans</i>	(R-C)		

Cerradão.—Certain sections in the Floresta Nacional Araripe-Apodí differ substantially from the Cerrado vegetation in both density, physiognomy, and species compo-

sition. Stands with many trees, few shrubs and little grass are herein referred to as Cerradão. The Cerradão is composed of larger trees which form a more or less continuous canopy between 12 and 17 m high, and the trees do not have the twisted appearance characteristic of the Cerrado. Tree density is much greater in the Cerradão than in the Cerrado. The understory may vary considerably from quite dense to sparse; in either case however, shrubs less than 1 m in height and grasses are quite rare. Mammals of the Cerradão portion of the Chapada are as follows:

<i>Didelphis albiventris</i>	(A)	<i>Artibeus jamaicensis</i>	(A)
<i>Saccopteryx bilineata</i>	(R)	<i>Desmodus rotundus</i>	(R)
<i>Noctilio leporinus</i>	(R)	<i>Myotis nigricans</i>	(R-C)
<i>Pteronotus davyi</i>	(R)	<i>Eptesicus brasiliensis</i>	(R)
<i>Micronycteris</i> sp.	(R)	<i>Lasiurus borealis</i>	(R)
<i>Micronycteris minuta</i>	(R)	<i>Molossops temminckii</i>	(R)
<i>Phyllostomus discolor</i>	(A)	<i>Tadarida</i> sp.	(R)
<i>Phyllostomus hastatus</i>	(A)	<i>Molossus molossus</i>	(R-C)
<i>Glossophaga soricina</i>	(A)	<i>Callithrix jacchus</i>	(R-C)
<i>Anoura geoffroyi</i>	(A)	<i>Euphractus sexinctus</i>	(U)
<i>Carollia perspicillata</i>	(A)	<i>Dasyprocta prymnolopha</i>	(C)
<i>Sturnira lilium</i>	(R-C)	<i>Proechimys</i> sp.	(U)
<i>Vampyrops lineatus</i>	(A)	<i>Cerdocyon thous</i>	(C)
<i>Artibeus concolor</i>	(R)	<i>Felis concolor</i>	(U)
<i>Artibeus lituratus</i>	(A)	<i>Mazama gouazoubira</i>	(R-C)

IV. Cerrado-Caatingas Contact Zone

The area around Valença do Piauí, Piauí, was chosen as a Caatingas-Cerrado contact zone because it had been previously used by Vanzolini (1976) in his analysis of the herpetofauna of the Caatingas and Cerrado of Brasil. Vanzolini discussed the flora and geomorphology of the area in some detail; it is sufficient here to point out that the area contains a number of contact zones between Caatingas and Cerrado habitats (that is, Cerrado without Caatingas enclaves, Cerrado with Caatingas enclaves at upper elevational limits, and Cerrado with Caatingas enclaves at the lower elevational limits). The total amount of time spent in the area of Valença do Piauí was limited, hence the absence of a species from the collection is not indicative of its absence from the area. More intensive field work is required to substantiate the abundance and distribution of mammals in these contact zones. Mammals whose occurrence in this region we were able to document include:

<i>Monodelphis domestica</i>	(U)	<i>Lasiurus ega</i>	(U)
<i>Didelphis albiventris</i>	(U)	<i>Molossops abrasus</i>	(U)
<i>Pteronotus davyi</i>	(U)	<i>Molossus ater</i>	(U)
<i>Pteronotus parnellii</i>	(U)	<i>Molossus molossus</i>	(U)
<i>Pteronotus personatus</i>	(U)	<i>Eumops</i> sp.	(U)
<i>Phyllostomus discolor</i>	(U)	<i>Kerodon rupestris</i>	(U)
<i>Lonchorhina aurita</i>	(U)	<i>Galea spixii</i>	(U)
<i>Glossophaga soricina</i>	(U)	<i>Thrichomys apereoides</i>	(U)
<i>Artibeus jamaicensis</i>	(U)		

V. Humid Forest

The plant community along the base of the Chapada do Araripe in the Municipality of Crato, Ceará, may be classified as a humid forest. The forest forms an irregular band



Fig. 14.—More mesic inland portions of the Northeast may support extensive palm forests such as that seen here. The sandy area in the foreground is a dried river bed. Across the state border from Teresina, Piauí, in the state of Maranhão.

which circumscribes the base of the Chapada do Araripe in the state of Ceará. Precipitation on the Crato side of the Chapada do Araripe is higher than in contiguous areas due to orographic rainfall patterns (Markham, 1972). Only a small amount of time was spent in the area, so extensive information about the vegetation is lacking. Many planted palms were evident, and the vegetation was dense and luxuriant (Fig. 13). Substantial areas that were once forested have been altered by human activity. A preliminary list of mammals of the humid forest is as follows:

<i>Didelphis albiventris</i>	(U)	<i>Vampyrops lineatus</i>	(C)
<i>Saccopteryx leptura</i>	(U)	<i>Artibeus jamaicensis</i>	(C)
<i>Micronycteris</i> sp.	(U)	<i>Artibeus lituratus</i>	(U)
<i>Phyllostomus hastatus</i>	(C)	<i>Desmodus rotundus</i>	(U)
<i>Glossophaga soricina</i>	(A)	<i>Myotis nigricans</i>	(U)
<i>Lonchophylla mordax</i>	(U)	<i>Molossus molossus</i>	(C-A)
<i>Anoura geoffroyi</i>	(U)	<i>Callithrix jacchus</i>	(U)
<i>Carollia perspicillata</i>	(A)	<i>Cerdocyon thous</i>	(U)
<i>Sturnira lilium</i>	(U)		

VI. Palm Groves

In the extreme northwest of the Caatingas an extensive forest of palm groves occurs in the more mesic areas (Fig. 14). In an attempt to make a preliminary collection of specimens from the area and select possible future study sites, we visited a few locations in the Municipality of Terezina, Piauí. More extensive work is required to characterize

the flora and fauna of the area, although we were able to establish the occurrence of a few species of mammals, including:

<i>Glossophaga soricina</i>	(U)	<i>Artibeus fuliginosus</i>	(U)
<i>Carollia perspicillata</i>	(U)	<i>Artibeus jamaicensis</i>	(U)
<i>Uroderma magnirostrum</i>	(U)	<i>Artibeus lituratus</i>	(U)
<i>Artibeus cinereus</i>	(U)		

ACCOUNTS OF SPECIES

Order Marsupialia

Family Didelphidae

Monodelphis domestica Wagner, 1842

This marsupial is a common inhabitant of the Caatingas. Favored habitats include rocky serrotes and lowland rock outcroppings. Reproduction is relatively aseasonal; the young are not protected by a marsupium. Although they are good climbers, they are principally terrestrial; they are also nocturnal. Laboratory animals accepted a wide variety of food items including various vertebrates, invertebrates, and fruits.

Specimens collected.—PERNAMBUCO (Município de Exu), Escola Agrícola de Exu, 0.7 km S of Exu (26); Fazenda Batente, 5.5 km SE of Exu (12); Fazenda Pinheira, 1.5 km SW of Exu (13); Município de Exu (11); (Município de Serra Talhada), Fazenda Saco, 6.6 km N of Serra Talhada (5). PIAUÍ (Município de Valença do Piauí), Fazenda Olho da Água, 2 km N of Valença do Piauí (1).

Specimens examined.—ALAGOAS (Limoeiro da Anadia), Sítio Barracão (1); (Palmeira dos Índios), Sítio Capuma (1); Sítio Dormião (1); Sítio Pannels (1); Sítio Riveira (1); Sítio Sabiá (3); (Santana do Ipanema), Sítio Lagoinha (1); (Viçosa), Sítio Cachoeira Grande (1). BAHIA (Feira), Fazenda Capoeira do Rosario (1); Fazenda Cazumba (1); Fazenda Jacú (1); Fazenda Salgado (1); (Serrinha), Fazenda Cacuá (1); Fazenda Oiteiro (2); Fazenda Umburana (1); no locality (2). CEARÁ (Campo Sales), Sítio Volta (1); (Crato), Sítio Constantino (1); no locality (1); Sítio Olaria (1); (Jardim), Sítio Cereado (1); (Milagres), Sítio Camara (1); (Missão Velho), Sítio Araruna (1); Sítio Emboscada (1); Sítio Lapinha (1); (São Benedito), Sítio Cinta da Solidade (1). PERNAMBUCO (Bodocó), Sítio Belem (1); Sítio Lopes (1); Sítio Paus Preto (1); Sítio São Gonçalo (1); Sítio Xique-Xique (1); (Garanhuns), Sítio Riacho Fundo (1); no locality (1); (Pesqueira), Fazenda Caianinha (1); Fazenda Sororoca (1); (Triunfo), Sítio Boa Esperança de Jerico (1); Sítio Borgens (2); Sítio Cana Brava de Jerico (2); Sítio Corredor do Vento (1); Sítio Macaco de Baixa Verde (1); Sítio Novo (1); Sítio Oiti (2); Sítio São Mateus (1).

Marmosa cinerea Temminck, 1824

Specimens examined.—BAHIA (Ilheus), Aritaqua Urucutuca (1); Banco da Vitoria, Pirataquisse (1); Buerarema Ribeirão da Fortuna (1); Rio do Braço, Fazenda Almeida (1); No locality, (11). PERNAMBUCO (dois Irmãos) (1).

Marmosa karimii Petter, 1968

This small marsupial was rare. Specimens were collected only in Low Caatinga and perennial shrub/low tree dominated successional

stages. An individual kept in the laboratory was adept at capturing insects and subsisted on insects and occasional hylid frogs and geckos; small amounts of fruit were eaten at times.

Specimens collected.—PERNAMBUCO (Município de Exu), 0.5 km S of Exu (1); Escola Agrícola de Exu, 0.7 km S of Exu (1); Fazenda Guarani, 2.9 km N of Exu (1); Município de Exu (1).

***Didelphis albiventris* Lund, 1841**

This large marsupial is a habitat generalist and ranges throughout the Caatingas. In the Exu area, it inhabited all microhabitats in addition to more mesic Cerrado localities, such as the Chapada do Araripe (occurring there both in Cerrado and Cerradão habitats). Microhabitat utilization and population density may exhibit seasonal shifts in Caatinga habitats corresponding to seasonal climatic changes. Reproduction is strongly synchronized, with the birth peak occurring during November and December; a marsupium is present. This species is mostly nocturnal and terrestrial in the Caatingas, and is broadly omnivorous.

Specimens collected.—CEARÁ (Município de Crato), Floresta Nacional Araripe-Apodí (13). PERNAMBUCO (Município de Exu), Escola Agrícola de Exu, 0.7 km S of Exu (3); Fazenda Batente, 5.5 km SE of Exu (5); Fazenda Uruguai, 4.8 km NE of Exu (1); Município de Exu (9); Serrote das Lages, 18 km S of Exu (3).

Specimens examined.—PERNAMBUCO (Garanhuns) (1).

Order Chiroptera

Family Emballonuridae

***Saccopteryx bilineata* (Temminck, 1838)**

Absent from the Caatingas; rare on the Chapada do Araripe.

Specimens collected.—CEARÁ (Município de Crato), Floresta Nacional Araripe-Apodí, 9 km S of Crato (1); Floresta Nacional Araripe-Apodí, 10 km SW of Crato (1).

***Saccopteryx leptura* Schreber, 1774**

Specimen collected.—CEARÁ (Município de Crato), Sítio Luanda, 4 km S of Crato (1).

***Peropteryx macrotis* (Wagner, 1843)**

Uncommon in the Caatingas. Roosts in small groups of up to 10 individuals, often occupying large openings inside rockpiles or culverts. Absent from Cerradão and Cerrado habitats on the Chapada do Araripe.

Specimens collected.—BAHIA (Município de Senhor do Bom Fim), Fazenda Lajeido, km 147 on Route BA 130 (5). PERNAMBUCO (Município de Exu), Escola Agrícola de Exu, 0.7 km S of Exu (1); Fazenda Batente, 5.5 km SE of Exu (3); Fazenda Pomonha,

21 km SSW of Exu (7); Serrote Gambá, 19 km SSW of Exu (4); (Município de São Lourenço da Mata), Estação Ecológica do Tapacurá (2); Mata do Camocim (7).

Family Noctilionidae

Noctilio leporinus (Linnaeus, 1758)

Rare in the Cerradão of the Chapada do Araripe where it probably occurs as a transient in the dry season. Common in the Caatingas where it roosts during the day in groups of up to 30 individuals in large hollow hardwood trees. A single night roost under a bridge containing over 100 individuals was consistently utilized from 1976 to 1978. The large accumulation of fecal material under the roost suggests that it had been in use for many years previous to our arrival in 1976.

Specimens collected.—CEARÁ (Município de Crato), Floresta Nacional Araripe-Apodí, 9 km S of Crato (4); Floresta Nacional Araripe-Apodí, 21 km SSW of Crato (1). PERNAMBUCO (Município de Exu), Escola Agrícola de Exu, 0.7 km S of Exu (1); Fazenda Alto de Ferreira, 5 km SW of Exu (14); Fazenda Batente, 5.5 km SE of Exu (1); Fazenda Colônia, 5.5 km S of Exu (136); Fazenda Guarani, 2.9 km N of Exu (6); Fazenda Pinheira, 1.5 km SW of Exu (12); Fazenda São José, 1.5 km N of Exu (2).

Family Mormoopidae

Pteronotus davyi Gray, 1838

Very rare in the Caatingas where it is found only in Caatinga Alta habitats. Also rare in Cerrado and Cerradão habitats of the Chapada do Araripe.

Specimens collected.—CEARÁ (Município de Crato), Floresta Nacional Araripe-Apodí, 8 km S of Crato (1); Floresta Nacional Araripe-Apodí, 9 km S of Crato (4); Floresta Nacional Araripe-Apodí, 8 km SSW of Crato (5); Floresta Nacional Araripe-Apodí, 17 km SSW of Crato (1). PERNAMBUCO (Município de Exu), Fazenda Cantareno, 4.5 km NNE of Exu (1). PIAUÍ (Município de Valença do Piauí), Fazenda Olho da Água, 2 km N of Valença do Piauí (1).

Pteronotus parnellii (Gray, 1843)

Absent from the Chapada do Araripe and the Caatingas. Netted only in a mesic Caatinga-Cerrado contact zone in Piauí.

Specimens collected.—PIAUÍ (Município de Valença do Piauí), Fazenda Olho da Água, 2 km N of Valença do Piauí (2).

Pteronotus personatus (Wagner, 1843)

Absent from the Chapada do Araripe; present, but rare, in some localities of the Caatingas. In all cases it has been netted near streams or lakes.

Specimens collected.—PERNAMBUCO (Município de Serra Talhada), Fazenda Saco (I.P.A.), 6.6 km NNE of Serra Talhada (1). PIAUÍ (Município de Valença do Piauí), Fazenda Olho da Água, 2 km N of Valença do Piauí (3).

Family Phyllostomatidae
Subfamily Phyllostomatinae

Micronycteris minuta (Gervais, 1855)

Specimens collected.—CEARÁ (Município de Crato), Floresta Nacional Araripe-Apodí, 9 km S of Crato (1); Floresta Nacional Araripe-Apodí, 8 km SSW of Crato (1). PERNAMBUCO (Município de Exu), Fazenda Cantareno, 4.5 km NNE of Exu (2); Serrote das Lajes, 17 km S of Exu (5); Serrote Gamba, 19 km SSW of Exu (1); (Município de São Lourenço da Mata), Estação Ecológica do Tapacurá (1).

Micronycteris sp.

Rare in the Caatingas where it was usually captured near serrotes or lajeiros. Rare on the Chapada do Araripe. This group of specimens appears not to conform in detail with the presently recognized species in the genus; further analysis is required to define the systematic affinities of this collection.

Specimens collected.—CEARÁ (Município de Crato), Floresta Nacional Araripe-Apodí, 8 km SSW of Crato (1); Sitio Luanda (Itaiteira), 4 km S of Crato (1); (Município de Nova Olinda), km 19 on Route CE 96, 4 km SE of Nova Olinda (3). PERNAMBUCO (Município de Exu), Fazenda Alto de Ferreira, 5 km SW of Exu (2); Fazenda Cantareno, 4.5 km NNE of Exu (1); Fazenda Pomonha, 21 km SSW of Exu (5); Serrote das Lajes, 17 km S of Exu (2).

Lonchorhina aurita Tomes, 1863

Absent from the Chapada do Araripe and the Caatingas. Present in areas of the Caatinga-Cerrado contact zone in Piauí.

Specimen collected.—PIAUI (Município de Valença do Piauí), Fazenda Olho da Agua, 2 km N of Valença do Piauí (1).

Tonatia bidens (Spix, 1823)

Absent from the Chapada do Araripe. Distribution primarily restricted to serrotes in the Caatingas.

Specimens collected.—PERNAMBUCO (Município de Exu), Fazenda Manicoba, 13.7 km SSW of Exu (5); Fazenda Pomonha, 21 km SSW of Exu (5); Serrote das Lajes, 17 km S of Exu (8); Serrote das Lajes, 17.7 km S of Exu (21); Serrote Gamba, 19 km SSW of Exu (6); Serrote Gritadeira, 18 km SSW of Exu (4).

Tonatia brasiliense (Peters, 1866b)

Absent from the Chapada do Araripe. Uncommon in the Caatingas where it is found either in Caatinga Alta habitats or near serrotes.

Specimens collected.—PERNAMBUCO (Município de Exu), Fazenda Batente, 5.5 km SE of Exu (1); Fazenda Cantareno, 4.5 km NNE of Exu (2); Fazenda Guarani, 2.9 km N of Exu (1); Serrote Gritadeira, 18 km SSW of Exu (2).

Mimon crenulatum (E. Geoffroy, 1810)

Rare in the Caatingas where it is found almost exclusively in Caatinga Alta habitats. Absent from the Chapada do Araripe.

Specimens collected.—PERNAMBUCO (Município de Exu), Fazenda Cantareno, 4.5 km NNE of Exu (3); Fazenda Colônia, 5.5 km S of Exu (1); Fazenda Paus Grandes, 14.2 km E of Exu (3).

Phyllostomus discolor (Wagner, 1843)

Locally common in banana and mango orchards in the Caatingas. Abundant and widespread throughout both Cerrado and Cerradão habitats of the Chapada do Araripe. It feeds primarily on fruits, although at least part of the year it appears to be nectarivorous and/or pollenivorous.

Specimens collected.—CEARÁ (Município de Crato), Aeroporto de Crato, 10 km SW of Crato (3); Floresta Nacional Araripe-Apodí, 8 km S of Crato (7); Floresta Nacional Araripe-Apodí, 9 km S of Crato (113); Floresta Nacional Araripe-Apodí, 10 km SSW of Crato (3); Floresta Nacional Araripe-Apodí, 11 km SSW of Crato (1); Floresta Nacional Araripe-Apodí, 13 km SSW of Crato (5); Floresta Nacional Araripe-Apodí, 17 km SSW of Crato (18); Floresta Nacional Araripe-Apodí, 21 km SSW of Crato (1); Floresta Nacional Araripe-Apodí, 10 km SW of Crato (14). PERNAMBUCO (Município de Exu), Fazenda Alto de Ferreira, 5 km SW of Exu (1); Fazenda Bom Jesus, 8 km NNW of Exu (11); Fazenda Manicoba, 13.7 km SSW of Exu (9); Fazenda São José, 1.5 km N of Exu (4); Serrote das Lajes, 17 km S of Exu (1); Serrote das Lajes, 17.7 km S of Exu (1); Serrote Gambá, 19 km SSW of Exu (3); Serrote Gritadeira, 18 km SSW of Exu (1). PIAUÍ (Município de Valença do Piauí), Fazenda Olho da Água, 2 km N of Valença do Piauí (1).

Phyllostomus hastatus (Pallas, 1767)

Occasionally present in the Caatingas, but probably a transient from the Chapada do Araripe. Widespread and common throughout the Chapada in both Cerrado and Cerradão habitats. A colony of over 100 individuals of both sexes was found roosting inside an archway at the entrance to the Colégio Agrícola de Crato. The diet appears to be primarily frugivorous, although some insect remains were observed in its feces.

Specimens collected.—BAHIA (Município de Juazeiro da Bahia), Fazenda Barrinha (2). CEARÁ (Município de Crato), Colégio Agrícola de Crato, 5 km W of Crato (102); Floresta Nacional Araripe-Apodí, 8 km S of Crato (1); Floresta Nacional Araripe-Apodí, 13 km SSW of Crato (3); Floresta Nacional Araripe-Apodí, 17 km SSW of Crato (1); Floresta Nacional Araripe-Apodí, 9 km SW of Crato (1); Floresta Nacional Araripe-Apodí, 10 km SW of Crato (16); Floresta Nacional Araripe-Apodí, 9 km W of Crato (1); Floresta Nacional Araripe-Apodí, 10 km W of Crato (2). PERNAMBUCO (Município de Exu), Fazenda Bom Jesus, 0.8 km NNW of Exu (1); Fazenda Colônia, 5.5 km S of Exu (1); Serrote das Lajes, 17 km S of Exu (1); Serrote Gambá, 19 km SSW of Exu (1); (Município de São Lourenço da Mata), Estação Ecológico do Tapacurá (3).

Trachops cirrhosus (Spix, 1823)

Absent from the Chapada do Araripe. Distribution in the Caatingas restricted to serrotes or areas containing rocky outcroppings.

Specimens collected.—BAHIA (Município de Juazeiro da Bahia), Fazenda São Raimundo, km 216 on Route BA 130 (1). PERNAMBUCO (Município de Exu), Fazenda Batente, 5.5 km SE of Exu (5); Fazenda Colônia, 5.5 km S of Exu (1); Fazenda Guarani, 2.9 km N of Exu (3); Serrote das Lajes, 17 km S of Exu (26); Serrote das Lajes, 17.7 km S of Exu (1); Serrote Gritadeira, 18 km SSW of Exu (2).

Subfamily Glossophaginae**Glossophaga soricina (Pallas, 1766)**

Abundant and ubiquitous in Cerrado, Cerradão, and most habitats of the Caatingas. At times found roosting with *Carollia perspicillata* in caves and man-made structures. Present in all other major vegetation zones of the Northeast.

Specimens collected.—BAHIA (Município de Senhor do Bom Fim), Fazenda Flamengo, km 150 on Route BA 130 (1); Fazenda Morro da Imburana, km 145 on Route BA 130 (1). CEARÁ (Município de Crato), Aeroporto de Crato, 10 km SW of Crato (14); Colégio Agrícola de Crato, 5 km W of Crato (285); Fazenda Fundão, 3 km SSE of Crato (11); Floresta Nacional Araripe-Apodí, 8 km S of Crato (21); Floresta Nacional Araripe-Apodí, 9 km S of Crato (52); Floresta Nacional Araripe-Apodí, 8 km SSW of Crato (25); Floresta Nacional Araripe-Apodí, 10 km SSW of Crato (10); Floresta Nacional Araripe-Apodí, 11 km SSW of Crato (1); Floresta Nacional Araripe-Apodí, 13 km SSW of Crato (35); Floresta Nacional Araripe-Apodí, 17 km SSW of Crato (3); Floresta Nacional Araripe-Apodí, 21 km SSW of Crato (3); Floresta Nacional Araripe-Apodí, 9 km SW of Crato (1); Floresta Nacional Araripe-Apodí, 10 km SW of Crato (18); Floresta Nacional Araripe-Apodí, 11 km SW of Crato (3); Floresta Nacional Araripe-Apodí, 14 km SW of Crato (10); (Município de Nova Olinda), km 19 on Route CE 96, 4 km SE of Nova Olinda (9). PERNAMBUCO (Município de Exu), Escola Agrícola de Exu, 0.7 km S of Exu (236); Fazenda Barracão, 19.8 km SW of Exu (2); Fazenda Batente, 5.5 km SE of Exu (3); Fazenda Bom Jesus, 0.8 km NNW of Exu (23); Fazenda Colônia, 5.5 km S of Exu (1); Fazenda Guarani, 2.9 km N of Exu (3); Fazenda Manicoba, 13.7 km SSW of Exu (3); Fazenda Pomonha, 21 km SSW of Exu (13); Fazenda São José, 1.5 km N of Exu (22); Serrote das Lajes, 17 km S of Exu (22); Serrote das Lajes, 17.7 km S of Exu (3); Serrote Gamba, 19 km SSW of Exu (5); Serrote Gritadeira, 18 km SSW of Exu (12); (Município de São Lourenço da Mata) Estação Ecológico do Tapacurá (13); (Município de Serra Talhada), Fazenda Salto, 35 km NNE of Serra Talhada (1). PIAUÍ (Município de Teresina), km 18 on Route BR 316 (1); (Município de Valença do Piauí), Fazenda Olho da Água, 2 km N of Valença do Piauí (2); (Watering hole), 5 km W of Valença do Piauí (1).

Lonchophylla mordax Thomas, 1903

Common in the Caatingas, especially near serrotes. Absent from Cerradão and Cerrado habitats of the Chapada do Araripe.

Specimens collected.—BAHIA (Município de Juazeiro da Bahia), Fazenda São Raimundo, km 216 on Route BA 130, (1). CEARÁ (Município de Nova Olinda), km 19 on Route CE 96, 4 km SE of Nova Olinda (9). PERNAMBUCO (Município de Exu), Fazenda

Cantareno, 4.5 km NE of Exu (1); Fazenda Colônia, 5.5 km S of Exu (2); Fazenda Guarani, 2.9 km N of Exu (1); Fazenda Manicoba, 13.7 km SSW of Exu (2); Fazenda Pomonha, 21 km SSW of Exu (9); Serrote das Lajes, 17 km S of Exu (41); Serrote das Lajes, 17.7 km S of Exu (6); Serrote Gambá, 19 km SSW of Exu (5); Serrote Gritadeira, 18 km SSW of Exu (5).

Anoura geoffroyi Gray, 1838

Uncommon in the Caatingas where it is usually associated with serrote habitats. Locally abundant in more open areas of Cerradão or in the Cerrado areas of the Chapada do Araripe.

Specimens collected.—CEARÁ (Município de Crato), Floresta Nacional Araripe-Apodí, 8 km S of Crato (1); Floresta Nacional Araripe-Apodí, 9 km S of Crato (3); Floresta Nacional Araripe-Apodí, 8 km SSW of Crato (59); Floresta Nacional Araripe-Apodí, 10 km SSW of Crato (1); Floresta Nacional Araripe-Apodí, 21 km SSW of Crato (1); Floresta Nacional Araripe-Apodí, 11 km SW of Crato (1); Floresta Nacional Araripe-Apodí, 10 km W of Crato (1); Sítio Luanda (Itaiteira), 4 km S of Crato (1); (Município de Nova Olinda), km 19 on Route CE 96, 4 km SE of Nova Olinda (23). PERNAMBUCO (Município de Exu), Escola Agrícola de Exu, 0.7 km S of Exu (1); Fazenda Bom Jesus, 0.8 km NNW of Exu (4); Fazenda Pomonha, 21 km SSW of Exu (10); Fazenda São José, 1.5 km N of Exu (1); Serrote das Lajes, 17 km S of Exu (1); Serrote das Lajes, 17.7 km S of Exu (1).

Subfamily Carolliinae

Carollia perspicillata (Linnaeus, 1758)

Abundant and ubiquitous in all habitats of the Caatingas, Cerrado, and Cerradão. Present in all other major vegetation zones. Found roosting in both man-made structures and caves, sometimes in association with *Glossophaga soricina*.

Specimens collected.—CEARÁ (Município de Crato), Aeroporto de Crato, 10 km SW of Crato (19); Colégio Agrícola de Crato, 5 km W of Crato (19); Fazenda Fundão, 3 km SSE of Crato (1); Floresta Nacional Araripe-Apodí, 8 km S of Crato (51); Floresta Nacional Araripe-Apodí, 9 km S of Crato (181); Floresta Nacional Araripe-Apodí, 8 km SSW of Crato (58); Floresta Nacional Araripe-Apodí, 10 km SSW of Crato (37); Floresta Nacional Araripe-Apodí, 13 km SSW of Crato (22); Floresta Nacional Araripe-Apodí, 17 km SSW of Crato (23); Floresta Nacional Araripe-Apodí, 21 km SSW of Crato (7); Floresta Nacional Araripe-Apodí, 9 km SW of Crato (16); Floresta Nacional Araripe-Apodí, 10 km SW of Crato (120); Floresta Nacional Araripe-Apodí, 11 km SW of Crato (12); Floresta Nacional Araripe-Apodí, 9 km W of Crato (36); (Município de Nova Olinda), km 19 on Route CE 96, 4 km SE of Nova Olinda (1). PERNAMBUCO (Município de Exu), Escola Agrícola de Exu, 0.7 km S of Exu (10); Fazenda Alto de Ferreira, 5 km SW of Exu (1); Fazenda Cantareno, 4.5 km NNE of Exu (11); Fazenda Colônia, 5.5 km S of Exu (14); Fazenda Guarani, 2.9 km N of Exu (5); Fazenda Manicoba, 13.7 km SSW of Exu (22); Fazenda Paus Grandes, 14.2 km E of Exu (1); Fazenda Pomonha, 21 km SSW of Exu (26); Fazenda São José, 1.5 km N of Exu (2); Fazenda São Pedro, 1 km ESE of Exu (1); Fazenda Santa Helena, 1 km NE of Exu (1); Serrote das Lajes, 17 km S of Exu (108); Serrote das Lajes, 17.7 km S of Exu (35); Serrote Gambá, 19 km SSW of Exu (5); Serrote Gritadeira, 18 km SSW of Exu (28); (Município de São Lourenço da Mata), Estação Ecológica do Tapacurá (19). PIAUÍ (Município de Teresina), km 18 on

Route BR 316 (9); (Município de Valença do Piauí), Fazenda Olho da Agua, 2 km N of Valença do Piauí (15).

Subfamily Sturnirinae

***Sturnira lilium* (E. Geoffroy, 1810)**

Uncommon in the Caatingas where it is primarily restricted to Caatinga Alta habitats. Uncommon in both Cerradão and Cerrado habitats of the Chapada do Araripe.

Specimens collected.—CEARÁ (Município de Crato), Aeroporto de Crato, 10 km SW of Crato (2); Floresta Nacional Araripe-Apodí, 9 km S of Crato (4); Floresta Nacional Araripe-Apodí, 8 km SSW of Crato (7); Floresta Nacional Araripe-Apodí, 10 km SSW of Crato (1); Floresta Nacional Araripe-Apodí, 10 km SW of Crato (2); Floresta Nacional Araripe-Apodí, 11 km SW of Crato (4); Floresta Nacional Araripe-Apodí, 9 km W of Crato (1); Sítio Luanda (Itaiteira), 4 km S of Crato (9). PERNAMBUCO (Município de Exu), Fazenda Batente, 5.5 km SE of Exu (1); Fazenda Cantareno, 4.5 km NNE of Exu (3); Fazenda Maniçoba, 13.7 km SSW of Exu (3); (Município de São Lourenço da Mata), Estação Ecológico do Tapacurá (4).

Subfamily Stenodermatinae

***Uroderma bilobatum* Peters, 1866a**

Very rare both in the Caatingas and on the Chapada do Araripe.

Specimens collected.—CEARÁ (Município de Crato), Floresta Nacional Araripe-Apodí, 8 km SSW of Crato (1); Floresta Nacional Araripe-Apodí, 11 km SW of Crato (1). PERNAMBUCO (Município de Exu), Açude Itamaragi, 0.5 km S of Exu (1); Fazenda Pomonha, 21 km SSW of Exu (1).

***Uroderma magnirostrum* Davis, 1968**

Specimen collected.—PIAÚI (Município de Terezina), km 18 on Route BR 316 (1).

***Vampyrops lineatus* (E. Geoffroy, 1810)**

Very abundant and widespread in both Caatingas and Chapada habitats. In the Caatingas, it has been found roosting in caves in groups of no more than 12 individuals.

Specimens collected.—CEARÁ (Município de Crato), Aeroporto de Crato, 10 km SW of Crato (31); Colégio Agrícola de Crato, 5 km W of Crato (18); Floresta Nacional Araripe-Apodí, 8 km S of Crato (4); Floresta Nacional Araripe-Apodí, 9 km S of Crato (18); Floresta Nacional Araripe-Apodí, 8 km SSW of Crato (35); Floresta Nacional Araripe-Apodí, 10 km SSW of Crato (43); Floresta Nacional Araripe-Apodí, 13 km SSW of Crato (6); Floresta Nacional Araripe-Apodí, 17 km SSW of Crato (16); Floresta Nacional Araripe-Apodí, 21 km SSW of Crato (8); Floresta Nacional Araripe-Apodí, 9 km SW of Crato (4); Floresta Nacional Araripe-Apodí, 10 km SW of Crato (9); Floresta Nacional Araripe-Apodí, 11 km SW of Crato (20); Floresta Nacional Araripe-Apodí, 9 km W of Crato (6); Sítio Luanda (Itaiteira), 4 km S of Crato (10); (Município de Nova Olinda), km 19 on Route CE 96, 4 km SE of Nova Olinda (6). PERNAMBUCO (Município de Exu), Escola Agrícola de Exu, 0.7 km S of Exu (4); Fazenda Batente, 5.5 km SE of Exu (4); Fazenda Bom Jesus, 0.8 km NNW of Exu (8); Fazenda Cantareno, 4.5 km

NNE of Exu (2); Fazenda Colônia, 5.5 km S of Exu (4); Fazenda Gravata, 3.1 km NW of Exu (2); Fazenda Guarani, 2.9 km N of Exu (16); Fazenda Maniçoba, 13.7 km SSW of Exu (9); Fazenda Pomonha, 21 km SSW of Exu (49); Fazenda São José, 1.5 km N of Exu (42); Fazenda Santa Helena, 1 km NE of Exu (8); Serrote das Lajes, 17 km S of Exu (108); Serrote das Lajes, 17.7 km S of Exu (20); Serrote Gambá, 19 km SSW of Exu (13); Serrote Gritadeira, 18 km SSW of Exu (13).

Artibeus cinereus (Gervais, 1856)

Absent from habitats in both the Caatingas and the Chapada do Araripe. Present in remnant Atlantic Tropical Forest and in palm groves.

Specimens collected.—PERNAMBUCO (Município de São Lourenço da Mata), Estação Ecológico do Tapacurá (6). PIAUÍ (Município de Teresina), km 18 on Route BR 316 (5).

Artibeus concolor Peters, 1865a

Present but rare on the Chapada do Araripe in Cerrado habitats. Absent from all habitats of the Caatingas.

Specimens collected.—CEARÁ (Município de Crato), Aeroporto de Crato, 10 km SW of Crato (1); Floresta Nacional Araripe-Apodí, 8 km SSW of Crato (3); Floresta Nacional Araripe-Apodí, 10 km SSW of Crato (3); Floresta Nacional Araripe-Apodí, 10 km SW of Crato (4); Floresta Nacional Araripe-Apodí, 11 km SW of Crato (1).

Artibeus fuliginosus Gray, 1838

Present in palm groves but absent from all habitats of the Caatingas and Chapada do Araripe.

Specimen collected.—PIAUÍ (Município de Teresina), km 18 on Route BR 316 (1).

Artibeus jamaicensis Leach, 1821

Abundant and ubiquitous in both Cerrado and Cerradão habitats; present throughout the Caatingas but locally abundant on, or near, serrotes. Present in all other major vegetation zones.

Specimens collected.—BAHIA (Município de Juazeiro da Bahia), Fazenda Barrinha (5); Fazenda São Raimundo, km 216 on Route BA 130 (1). CEARÁ (Município de Crato), Colégio Agrícola de Crato, 5 km W of Crato (10); Floresta Nacional Araripe-Apodí, 8 km S of Crato (37); Floresta Nacional Araripe-Apodí, 9 km S of Crato (66); Floresta Nacional Araripe-Apodí, 8 km SSW of Crato (1); Floresta Nacional Araripe-Apodí, 10 km SSW of Crato (50); Floresta Nacional Araripe-Apodí, 11 km SSW of Crato (1); Floresta Nacional Araripe-Apodí, 13 km SSW of Crato (3); Floresta Nacional Araripe-Apodí, 17 km SSW of Crato (8); Floresta Nacional Araripe-Apodí, 21 km SSW of Crato (3); Floresta Nacional Araripe-Apodí, 10 km SW of Crato (11); Floresta Nacional Araripe-Apodí, 11 km SW of Crato (4); Floresta Nacional Araripe-Apodí, 9 km W of Crato (5); Sítio Luanda (Itaiteira), 4 km S of Crato (5); (Município de Nova Olinda), km 19 on Route CE 96, 4 km SE of Nova Olinda (9). PERNAMBUCO (Município de Exu), Escola Agrícola de Exu, 0.7 km S of Exu (1); Fazenda Alto de Ferreira, 5 km SW of Exu (1); Fazenda Cantareno, 4.5 km NNE of Exu (5); Fazenda Colônia, 5.5 km S of Exu (4);

Fazenda Guarani, 2.9 km N of Exu (4); Fazenda Pomonha, 21 km SSW of Exu (44); Fazenda São José, 1.5 km N of Exu (2); Serrote das Lajes, 17 km S of Exu (79); Serrote das Lajes, 17.7 km S of Exu (34); Serrote Gamba, 19 km SSW of Exu (5); Serrote Gritadeira, 18 km SSW of Exu (28); (Município de São Lourenço da Mata), Estação Ecológico do Tapacurá (23). PIAUI (Município de Teresina), km 18 on Route BR 316 (2); (Município de Valença do Piauí), Fazenda Olho da Agua, 2 km N of Valença do Piauí (17).

***Artibeus lituratus* (Olfers, 1818)**

Abundant and widespread on the Chapada do Araripe in both Cerradão and Cerrado habitats. Widespread, but uncommon, throughout the Caatingas. Present in remnant Atlantic Forest and palm grove habitats.

Specimens collected.—CEARÁ (Município de Crato), Aeroporto de Crato, 10 km SW of Crato (24); Floresta Nacional Araripe-Apodí, 8 km S of Crato (24); Floresta Nacional Araripe-Apodí, 9 km S of Crato (43); Floresta Nacional Araripe-Apodí, 8 km SSW of Crato (8); Floresta Nacional Araripe-Apodí, 10 km SSW of Crato (5); Floresta Nacional Araripe-Apodí, 13 km SSW of Crato (8); Floresta Nacional Araripe-Apodí, 17 km SSW of Crato (14); Floresta Nacional Araripe-Apodí, 21 SSW of Crato (12); Floresta Nacional Araripe-Apodí, 9 km SW of Crato (5); Floresta Nacional Araripe-Apodí, 10 km SW of Crato (90); Floresta Nacional Araripe-Apodí, 11 km SW of Crato (16); Floresta Nacional Araripe-Apodí, 14 km SW of Crato (1); Floresta Nacional Araripe-Apodí, 19 km SW of Crato (1); Floresta Nacional Araripe-Apodí, 9 km W of Crato (25); (Município de Nova Olinda), km 19 on Route CE 96, 4 km SE of Nova Olinda (2). PERNAMBUCO (Município de Exu), Escola Agrícola de Exu, 0.7 km S of Exu (2); Fazenda Bom Jesus, 0.8 km NNW of Exu (2); Fazenda Cantareno, 4.5 km NNE of Exu (9); Fazenda Guarani, 2.9 km N of Exu (12); Fazenda Maniçoba, 13.7 km SSW of Exu (2); Fazenda Paus Grandes, 14.2 km E of Exu (2); Fazenda Pomonha, 21 km SSW of Exu (11); Fazenda São José, 1.5 km N of Exu (3); Serrote das Lajes, 17 km S of Exu (2); Serrote Gamba, 19 km SSW of Exu (2); (Município de São Lourenço da Mata), Estação Ecológico do Tapacurá (2). PIAUI (Município de Teresina), km 18 on Route BR 316 (4).

Subfamily Desmodontinae

***Desmodus rotundus* (E. Geoffroy, 1810)**

Common in the Caatingas where it is locally abundant on serrotes. Rare on the Chapada do Araripe, perhaps due to the paucity of livestock.

Specimens collected.—BAHIA (Município de Senhor do Bom Fim), Morro da Imburana, km 145 on Route BA 130 (1). CEARÁ (Município de Crato), Floresta Nacional Araripe-Apodí, 8 km S of Crato (1); Floresta Nacional Araripe-Apodí, 9 km S of Crato (4); Floresta Nacional Araripe-Apodí, 8 km SSW of Crato (2); Floresta Nacional Araripe-Apodí, 10 km SSW of Crato (1); Floresta Nacional Araripe-Apodí, 13 km SSW of Crato (1); Floresta Nacional Araripe-Apodí, 17 km SSW of Crato (3); Floresta Nacional Araripe-Apodí, 10 km SW of Crato (1); (Município de Nova Olinda), km 19 on Route CE 96, 4 km SE of Nova Olinda (32). PERNAMBUCO (Município de Exu), Fazenda Alto de Ferreira, 5 km SW of Exu (3); Fazenda Batente, 5.5 km SE of Exu (2); Fazenda Bom Jesus, 0.8 km NNW of Exu (3); Fazenda Cantareno, 4.5 km NNE of Exu (1); Fazenda Maniçoba, 13.7 km SSW of Exu (73); Fazenda Paus Grandes, 14.2 km E of Exu (4);

Fazenda Pomonha, 21 km SSW of Exu (2); Serrote das Lajes, 17 km S of Exu (49); Serrote das Lajes, 17.7 km S of Exu (225); Serrote Gamba, 19 km SSW of Exu (4); Serrote Gritadeira, 18 km SSW of Exu (5); (Município de São Lourenço da Mata), Estação Ecológico do Tapacurá (5).

***Diaemus youngii* (Jentink, 1893)**

Absent from both Caatinga and Chapada habitats. Present in remnant Atlantic Rain Forest.

Specimen collected.—PERNAMBUCO (Município de São Lourenço da Mata), Estação Ecológico do Tapacurá (1).

***Diphylla ecaudata* Spix, 1823**

Rare in the Caatingas; absent from the Chapada do Araripe.

Specimens collected.—PERNAMBUCO (Município de Exu), Fazenda Maniçoba, 13.7 km SSW of Exu (2); Serrote das Lajes, 17 km S of Exu (1); Serrote Gritadeira, 18 km SSW of Exu (1).

Family Natalidae

***Natalus stramineus* Gray, 1838**

Rare on the Chapada do Araripe; absent from the Caatingas.

Specimens collected.—CEARÁ (Município de Crato), Floresta Nacional Araripe-Apodí, 8 km S of Crato (2); Floresta Nacional Araripe-Apodí, 9 km S of Crato (1).

Family Furipteridae

***Furipterus horrens* (F. Cuvier, 1828)**

Absent from the Chapada do Araripe. Rare in the Caatingas, where it was only captured on serrotes. Flies at dusk.

Specimens collected.—PERNAMBUCO (Município de Exu), Serrote das Lajes, 17 km S of Exu (1); Serrote das Lajes, 17.7 km S of Exu (1).

Family Vespertilionidae

***Myotis nigricans* (Schinz, 1821)**

Rare to common in both Caatinga and Chapada habitats where it was found to roost in buildings under roofing tiles.

Specimens collected.—CEARÁ (Município de Crato), Aeroporto de Crato, 10 km SW of Crato (9); Floresta Nacional Araripe-Apodí, 9 km S of Crato (13); Floresta Nacional Araripe-Apodí, 8 km SSW of Crato (10); Floresta Nacional Araripe-Apodí, 11 km SSW of Crato (1); Floresta Nacional Araripe-Apodí, 13 km SSW of Crato (2); Floresta Nacional Araripe-Apodí, 17 km SSW of Crato (1); Floresta Nacional Araripe-Apodí, 10 km SW of Crato (12); Sítio Luanda (Itaiteira), 4 km S of Crato (8). PERNAMBUCO (Município de Exu), Escola Agrícola de Exu, 0.7 km S of Exu (184); Fazenda Batente, 5.5 km SE of Exu (11); Fazenda Bom Jesus, 0.8 km NNW of Exu (1); Fazenda Cantareno, 4.5 km NNE of Exu (5); Fazenda Pomonha, 21 km SSW of Exu (1); Fazenda São José, 1.5 km

N of Exu (2); Serrote das Lajes, 17 km S of Exu (2); (Município de São Lourenço da Mata), Estação Ecológica do Tapacurá (3); (Município de Serra Talhada), Fazenda Saco (I.P.A.), 6.6 km NNE of Serra Talhada (2).

***Eptesicus furinalis* D'Orbigny and Gervais, 1847**

Absent from the Caatingas. Present on the Chapada do Araripe where it is found roosting in buildings.

Specimens collected.—CEARÁ (Município de Crato), Aeroporto de Crato, 10 km SW of Crato (2); Floresta Nacional Araripe-Apodí, 9 km S of Crato (4); Floresta Nacional Araripe-Apodí, 10 km SW of Crato (16); Floresta Nacional Araripe-Apodí, 11 km SW of Crato (1).

***Rhogeessa tumida* H. Allen, 1866**

Absent from habitats of the Chapada do Araripe and from the Caatingas in the vicinity of Exu, Pernambuco.

Specimen collected.—BAHIA (Município de Juazeiro da Bahia), Fazenda São Raimundo, km 216 on Route BA 130 (1).

***Lasiurus borealis* (Müller, 1776)**

Absent from the Caatingas; rare on the Chapada do Araripe.

Specimens collected.—CEARÁ (Município de Crato), Aeroporto de Crato, 10 km SW of Crato (1); Floresta Nacional Araripe-Apodí, 9 km S of Crato (2); Floresta Nacional Araripe-Apodí, 10 km SW of Crato (2); Floresta Nacional Araripe-Apodí, 9 km W of Crato (5).

***Lasiurus ega* (Gervais, 1856)**

Present, but rare, in both Caatinga and Chapada habitats.

Specimens collected.—CEARÁ (Município de Crato), Aeroporto de Crato, 10 km SW of Crato (1); Floresta Nacional Araripe-Apodí, 10 km SW of Crato (1). PERNAMBUCO (Município de Exu), Fazenda Batente, 5.5 km SE of Exu (1); Fazenda Bom Jesus, 0.8 km NNW of Exu (3); Fazenda São José, 1.5 km N of Exu (1). PIAUÍ (Município de Valença do Piauí), Fazenda Olho da Água, 2 km N of Valença do Piauí (1).

Family Molossidae

***Molossops abrasus* (Temminck, 1826)**

Absent from both the Chapada do Araripe and the Caatingas. Present in the Caatinga-Cerrado contact zone of Piauí.

Specimens collected.—PIAUÍ (Município de Valença do Piauí), Fazenda Olho da Água, 2 km N of Valença do Piauí (3).

***Molossops greenhalli* (Goodwin, 1958)**

Absent from both Caatinga and Chapada habitats. Present in remnant Atlantic Rain Forest.

Specimen collected.—PERNAMBUCO (Município de São Lourenço da Mata), Estação Ecológico do Tapacurá (1).

***Molossops planirostris* (Peters, 1865)**

Rare in the Caatingas; absent from the Chapada do Araripe.

Specimens collected.—PERNAMBUCO (Município de Exu), Fazenda Pau Ferrado, 2.6 km E of Exu (3).

***Molossops teminckii* (Burmeister, 1854)**

Rare in the Caatingas, caught exclusively on serrotes or near rocky outcroppings. Most active at dusk and early evening.

Specimens collected.—CEARÁ (Município de Crato), Floresta Nacional Araripe-Apodí, 9 km S of Crato (4); Floresta Nacional Araripe-Apodí, 10 km SSW of Crato (2); Floresta Nacional Araripe-Apodí, 8 km SSW of Crato (1). PERNAMBUCO (Município de Exu), Fazenda Batente, 5.5 km SE of Exu (2); Serrote Gambá, 19 km SSW of Exu (2).

***Neoplatymops mattogrossensis* (Vieira, 1942)**

Absent from the Chapada do Araripe. Common in rocky habitats and on serrotes in the Caatingas. Roosts in low-lying rock crevices; flies at dusk and early evening.

Specimens collected.—PERNAMBUCO (Município de Exu), Fazenda Batente, 5.5 km SE of Exu (23); Fazenda Cantareno, 4.5 km NNE of Exu (11); Fazenda Maniçoba, 13.7 km SSW of Exu (5); Fazenda Pinheira, 1.5 km SW of Exu (1); Fazenda Pomonha, 21 km SSW of Exu (1); Serrote Gambá, 19 km SSW of Exu (3); Serrote Gritadeira, 18 km SSW of Exu (8).

***Tadarida laticaudata* (Geoffroy, 1805)**

Specimens collected.—PERNAMBUCO (Município de Exu), Escola Agrícola de Exu, 0.7 km S of Exu (3).

***Tadarida* sp.**

Specimens collected.—CEARÁ (Município de Crato), Floresta Nacional Araripe-Apodí, 9 km W of Crato (1).

***Eumops* sp.**

Absent from the Chapada do Araripe and the Caatingas. Present in the Caatinga-Cerrado contact zone of Piauí.

Specimen collected.—PIAUI (Município de Valença do Piauí), (Watering hole), 5 km W of Valença do Piauí (1).

***Molossus ater* (E. Geoffroy, 1805)**

Rare in the Caatingas.

Specimens collected.—CEARÁ (Município de Nova Olinda), km 19 on Route CE 96, 4 km SE of Nova Olinda (1). PERNAMBUCO (Município de Exu), Fazenda Batente, 5.5 km SE of Exu (1); Fazenda Guarani, 2.9 km N of Exu (1). PIAUÍ (Município de Valença do Piauí), Fazenda Olho da Agua, 2 km N of Valença do Piauí (1); (Watering hole), 5 km W of Valença do Piauí (3).

Molossus molossus (Pallas, 1766)

More or less common in both the Caatingas and Chapada habitats. It may, however, be locally abundant in either habitat near man-made structures which it utilizes as roosts.

Specimens collected.—CEARÁ (Município de Crato), Aeroporto de Crato, 10 km SW of Crato (11); Colégio Agrícola de Crato, 5 km W of Crato (138); Floresta Nacional Araripe-Apodí, 10 km SW of Crato (4). PERNAMBUCO (Município de Exu), Escola Agrícola de Exu, 0.7 km S of Exu (62); Fazenda Batente, 5.5 km SE of Exu (1); Serrote das Lajes, 17 km S of Exu (1); (Município de Serra Talhada), Fazenda Saco (I.P.A.), 6.6 km NNE of Serra Talhada (45). PIAUÍ (Município de Valença do Piauí), Fazenda Olho da Agua, 2 km N of Valença do Piauí (13); (Watering hole), 5 km W of Valença do Piauí (2).

Promops sp.

Very rare in the Caatingas; found only in association with man-made structures. Absent from the Chapada do Araripe.

Specimens collected.—PERNAMBUCO (Município de Exu), Cidade de Exu (1); Escola Agrícola de Exu, 0.7 km S of Exu (2).

Order Primates

Family Cebidae

Cebus apella Linnaeus, 1758

In general, *C. apella* is currently restricted to the more extensive, remnant pockets of Caatinga Alta. In the past, this species probably occurred in areas with riverine vegetation and palm forests (associated with the higher serrotes) which are contiguous with high Caatinga.

Specimens collected.—PERNAMBUCO (Município de Exu), Fazenda Cantareno, 4.5 km NNE of Exu (3).

Family Callithricidae

Callithrix jacchus Linnaeus, 1758

This species may be locally abundant in the remaining pockets of Caatinga Alta which also harbor *Cebus apella* and in smaller pockets where *Cebus* is absent. The ability to utilize Caatinga Baixa to some extent accounts in part for the greater abundance of *C. jacchus*. Laboratory specimens accepted various insects and fruits as food.

Specimens collected.—PERNAMBUCO (Município de Exu), Escola Agrícola de Exu, 0.7 km S of Exu (2); Fazenda Paus Grande, 14.2 km E of Exu (1); Fazenda Cantareno, 4.5 km NNE of Exu (8).

Specimens examined.—ALAGOAS (Manga Beiras), Usina Sinimbu (3); (Quebrangulo), Engenho Riachão (1). BAHIA (No locality), (1); (Rio Preto), Santa Rita de Cassia (1). CEARÁ (Crato), Chapada Araripe (1); (Pacoti), Sítio Alvoredo (1); Sítio Baixa Verde (3); Sítio Boa Vista (1); Sítio Coati (1); Sítio Flor (3); Sítio Goiabeira (2); Sítio Lorena (2); Sítio Mendoza (1); Sítio Umquaiana (5).

Order Edentata

Family Myrmecophagidae

Tamandua tetradactyla Linnaeus, 1758

Occurs primarily in pockets of Caatinga Alta and in the Cerrado portions of the Chapada do Araripe. Its distribution in the Caatingas is limited due to heavy hunting pressure.

Specimens collected.—PERNAMBUCO (Município de Exu), Fazenda Cantareno, 4.5 km NNE of Exu (2); Município de Exu (1).

Family Dasypodidae

Euphractus sexcinctus Linnaeus, 1758

This armadillo may be found in a wider range of habitats and soil types than *Dasypus* and may even extend onto the bases of rocky serrotes. It is not as readily eaten as is *Dasypus*, and thus it experiences less hunting pressure.

Specimen collected.—PERNAMBUCO (Município de Exu), Município de Exu (1).

Dasypus novemcinctus Linnaeus, 1758

Uncommon in Caatingas and Cerrado habitats due to heavy hunting pressures. In protected areas, such as the Floresta Nacional Araripe-Apodí, it may be locally abundant. Prefers open areas with soft soils.

Specimen collected.—PERNAMBUCO (Município de Exu), Município de Exu (1).

Order Lagomorpha

Family Leporidae

Sylvilagus brasiliensis Linnaeus, 1758

The single specimen was collected in a complex area of interdigitating cultivated fields, abandoned fields of various ages and low Caatinga.

Specimen collected.—BAHIA (Município de Senhor do Bom Fim), Route BA 130 (1).

Specimens examined.—ALAGOAS (Quebrangulo), Engenho Juliana (1); (Viçosa), Fazenda São José (1). BAHIA (Campo Formosa), Fazenda Rapousa (1). PERNAMBUCO (Garanhuns), Sítio Cavaquinho (1); Sítio Inhumas (1).

Order Rodentia

Family Muridae

Subfamily Cricetinae

***Oryzomys elurus* Wagner, 1845**

Found in interface areas of thick brush and cultivated fields of grass with a relatively mesic microclimate. This species is less frequently encountered than *O. subflavus*.

Specimens collected.—CEARÁ (Município de Crato), Colégio Agrícola de Crato, 5 km W of Crato (1); Floresta Nacional Araripe-Apodí (2). PERNAMBUCO (Município de Exu), Município de Exu (1).

Specimens examined.—ALAGOAS (Limoeiro de Anadia), Sítio Brêu (2); (Quebrangulo), Fazenda Lagoa dos Bois (2); (Viçosa), Sítio Canárias (1); Sítio Cachoeira Grande (1); Fazenda Pedra de Fogo (4). BAHIA (Seabra), Fazenda Cochô do Malheiros (2); Fazenda Furados (8). CEARÁ (Itapagé), Sítio Bom Jesus (1); Sítio Maia (2); Sítio Trata (1); (Itapipoca), Sítio Jacú (1); (Pacoti), Sítio Boa Esperança do Lapis (2); Sítio Espinho Vermelho (2); Sítio Ouro (1). MINAS GERAIS (Belo Horizonte), Bairro Gameleira (1); Secão Formecimento Agrícola (1); (Jaboticabas) (1); (Ouro Preto) (1). PERNAMBUCO (Garanhuns), Fazenda Caldeirão (1); Sítio Canhoto (1); Sítio Capim (1); Sítio Cavaquinho (1); Sítio Frexeira (1); Sítio Jambelo (1); Sítio Lajeiro (1); Sítio Riacho Seco (1); Fazenda São Paulo (1); Fazenda Velha (1).

***Oryzomys subflavus* Wagner, 1842**

This rodent is essentially a commensal. The distribution typically is limited to plots of sugarcane although other cultivated fields may harbor a few individuals.

Specimens collected.—CEARÁ (Município de Crato), Colégio Agrícola de Crato, 5 km W of Crato (1); Floresta Nacional Araripe-Apodí (1). PERNAMBUCO (Município de Exu), Escola Agrícola de Exu, 0.7 km S of Exu (1); Município de Exu (25); Fazenda Cana Mansa, 13.4 km SW of Exu (1); (Município de Serra Talhada), Fazenda Saco (I.P.A.), 6 km N of Serra Talhada (2); SUCAM (in the town of Triunfo), 28 km NNE of Serra Talhada (8).

Specimens examined.—ALAGOAS (Anadia), Sítio Brejo do Boi (1); (Palmeira dos Índios), Sítio Ribeiro (1); (Quebrangulo), Sítio Barro Preto (1); Sítio Olho d'Água do Monteiro (1); Fazenda Peri-peri (1); (Santana do Ipanema), Sítio Goiabeira (1); (Viçosa), Sítio São José (1); Fazenda São Pedro (1); Sítio Tangil 2° (2). BAHIA (Feira), Fazenda Cazumba (1); Sítio Tomba (1); Fazenda Três Riachos (3); (Serrinha), Sítio Baixa d'Água (1); Fazenda Outeiro (1); Fazenda Tiririca (8); Fazenda Umburana (1). CEARÁ (Crato), Sítio Arisco (2); Sítio Constantino (1); Sítio Crispin (1); Sítio Grangeiro (1); Sítio Passagem (2); (Guaraciaba), Sítio Mazagão (1); (Pacoti), Sítio Ladeira (1); (São Benedito), Sítio Barra (1); Sítio Chora (3); Sítio Piraguara (1). PERNAMBUCO (Garanhuns), Sítio Cajarana (1); Sítio Cavaquinho (1); Fazenda Colônia da Serra (1); Sítio Engenho do Maneão (1); Sítio Flamengo (1); Sítio Inhumas (1); Sítio Saco (1); Fazenda Serra da Pedra (1); Sítio Varzea-Ingá (1); Sítio Varzea-Redonda (1).

Rhipodomys mastacalis Lund, 1841

Specimens examined.—CEARÁ (Crato), Sítio Belo Horizonte (2); Sítio Caiano (1); Sítio Parque (1); Sítio Passagem (1); (São Benedito), Sítio Barros (1); Sítio Cantinho (1); Sítio Cegarro (1); Sítio Guaribas do Amaral (2); Sítio Macapá (1); Sítio Piraguará (3); Sítio São José da Boa Vista (1). PERNAMBUCO (Caruaru), Sítio Brejo do Buraco (3); Sítio Quandús (5); Fazenda Santa Maria (3); Sítio Serra dos Cavalos (4).

Akodon sp.

Specimens collected.—PERNAMBUCO (Município de São Lourenço da Mata), Estação Ecológico do Tapacurá (20).

Akodon arviculoides (Wagner, 1842)

Specimens examined.—ALAGOAS (Anadia), Sítio Brejo do Boi (1); (Viçosa), Fazenda Gitirana (4); Sítio Pedra da Fazenda dos Pereiras (3); Fazenda Poço-Feio (1); Sítio Timbó 2° (1). BAHIA (Serrinha), Fazenda Alagadiço Grande (1); Fazenda Europa (1); Fazenda João Congo (2); Fazenda Montanha (1); Fazendo Riacho Grande (1); Fazenda Tiririca (2). MINAS GERAIS (Conceição do Mato Dentro), Boca da Mata (2); Bocada Mulata (1); Mata do Dr. Daniel (7). PERNAMBUCO (Garanhuns), Sítio Brejo Grande (1); Sítio Camaratuba (1); Sítio Cavaquinho (3); Sítio Varzea do Ingá (3).

Bolomys lasiurus (Lund, 1841)

This species undergoes population eruptions of great magnitude at irregular intervals. Individuals inhabit cultivated (especially corn) and grass (maintained by grazing) fields or recently abandoned fields with thick ground cover. They are strictly terrestrial and sometimes construct "runways." Captive specimens were essentially omnivorous.

Specimens collected.—CEARÁ (Município do Crato), Floresta Nacional Araripe-Apodí (1). PERNAMBUCO (Município de Exu), 0.5 km SW of Exu (3); 1 km S of Exu (10); 1 km SW of Exu (4); 1.5 km S of Exu (2); 1.5 km SW of Exu (6); Escola Agrícola de Exu (AGGEU lab specimens), 0.7 km S of Exu (429); Fazenda Pinheira, 1.5 km SW of Exu (12); Município de Exu (60); Town of Exu (6); (Município de Serra Talhada), Fazenda Saco, 6 km N of Serra Talhada (10); SUCAM (in the town of Triunfo), 28 km NNE of Serra Talhada (9).

Specimens examined.—ALAGOAS (Capela), Fazenda Serra Alegre (1); (Quebrangulo), Fazenda Dourado (4); Sítio Olho d'Água do Monteiro (1); Fazenda Peri-peri (1); Fazenda Poço da Serra (1); Fazenda Santa Cruz (3). BAHIA (Conquista), Fazenda Barra Moranga (1); (Palmeiras), Sítio Bouqueirão (6); Campo de São João (3); Fazenda Conceição (1). CEARÁ (Itapagé), Camará (3); Sítio São João II (7). MINAS GERAIS (Alem Paraíba), Fazenda São Geraldo (5); (Volta Grande), Fazenda Paraíso (1); Fazenda Pombal (1). PERNAMBUCO (Caruaru), Sítio Pitombeira (1); Sítio Riacho dos Mocós (2); Fazenda Salgado (1); (Triunfo), Sítio Brejinho (1); Sítio Monte Alegre (1); Sítio Novo (1); Sítio Peri-peri (1); Sítio Salva Terra (1); Sítio São Bartolomeu (1).

Oxymycteris angularis (Thomas, 1909)

Specimens examined.—ALAGOAS (Quebrangulo), Engenho Riachão (2); (Viçosa), Sítio Amazonas (3); Sítio Bauauas (1); Fazenda Cachoeira Grande (1); Sítio Cambuim II (2); Sítio Engenho São José (1); Sítio Estrada Nova (2); Sítio Gravatá (2); Sítio Pedra de F. dos Pereiros (1); Fazenda Pindobinha (2); Fazenda Poço Feio (1); Fazenda Riachão

II (1); Fazenda São Manoel (3); Sítio Tamandua (1); Sítio Urucuba (1); Sítio Vila Maria Lia (2). CEARÁ (São Benedito), Sítio Pedra de Côco (1). PERNAMBUCO (Bonito), Sítio Rodiadouro (1); (Caruaru), Sítio Brejinho de Serra dos Cavalos (1); Sítio Brejo do Buraco (2); Sítio Capoeira (1); Fazenda Caruaru (7); Fazenda Santa Maria (3); Sítio Serra dos Cavalos (9).

***Calomys callosus* Rengger, 1830**

Caatinga Baixa and the latter stages of old field succession are preferred habitats. *Calomys* is nocturnal and an agile, active climber.

Specimens collected.—PERNAMBUCO (Município de Exu), 0.5 km S of Exu (1); Escola Agrícola de Exu, 0.7 km S of Exu (8); Fazenda Santa Helena, 1 km N of Exu (1); Município de Exu (7).

***Calomys* sp.**

Specimens examined.—BAHIA (Conquista), Fazenda Agrião (3); Sítio Batalha (2); Fazenda Espírito Santo (6); Fazenda Felícia (2); (Jequié), Fazenda Santa Maria (11); Fazenda Pedra Redonda (1); (No locality) (14).

***Wiedomys pyrrhorhinos* (Wied, 1821)**

Caatinga Baixa is the typical habitat of *Wiedomys*. This species is nocturnal and relatively rare.

Specimens collected.—BAHIA (Município de Juazeiro da Bahia), Fazenda São Raimundo, km 216 on Route BA 130 (1). CEARÁ (Município de Crato), Floresta Nacional Araripe-Apodí (1). PERNAMBUCO (Município de Exu), Escola Agrícola de Exu, 0.7 km S of Exu (12); Fazenda Pinheira, 1.5 km SW of Exu (3); Município de Exu (2).

Specimens examined.—ALAGOAS (Palmeira dos Índios), Sítio Ribeira (1); (Quebrangulo), Fazenda Lagoas dos Bois (1); Fazenda Santa Cruz II (6); (Santana do Ipanema), Sítio Lagoinha (2). BAHIA (Feira), Fazenda Tanque do Pasto (1); Fazenda Trez Riacho (3); (Seabra), Lagoa Seca (3); Varzea da Canabrava (3). CEARÁ (Campo Sales), Sítio Cantos (1); (Ipú), Cidade (1); Fazenda Lages (3); Sítio Pereiros (1); (Missão Velha), Sítio Açude Velho (1); Sítio Cachoeira (1); (São Benedito), Sítio Alto (1); Sítio Barros (1). PERNAMBUCO (Caruaru), Sítio Canhoto (2); Sítio Gravatá (2); Pingueiras (6); Sítio Preguiça (6); Sítio Roncaria (1); Fazenda Serraria (4).

***Holochilus brasiliensis* (Desmarest, 1819)**

Specimens examined.—ALAGOAS (Quebrangulo), Fazenda Bento de Barros (2); Sítio Mauras (1); Fazenda Peri-peri (3); (Viçosa), Fazenda Pindobinha (1); Sítio Tangil (3). BAHIA (Bom Jesus-Lapa), Ilha do Medo (7). CEARÁ (Barbalha), Sítio Barreiras (1); Sítio Tupinamba (3); (Crato), Sítio Passagem (4); (Ipú), Sítio Gagas (1); (Joazeiro), Sítio Boca das Cobras (5); (Pacoti), Sítio Espinho Vermelho (2); (São Benedito), Sítio Carangueijo (1); Sítio Catinguinha (1); Sítio Muricatuba (1). MINAS GERAIS (Santa), Bicas Lagoa (3). PERNAMBUCO (Garanhuns), Sítio Cavaquinho (1); Fazenda Cristovão (1); Sítio Frixeira (1); Sítio Inhumas (5); Sítio Laranja (1); Fazenda Trairas (1).

Subfamily Murinae

***Rattus rattus* Linnaeus, 1758**

This species is a common commensal. The current distribution includes man-made dwellings in towns and outlying fazendas. *R. rattus*

is of particular interest because it is a vector of an endemic form of bubonic plague.

Specimens collected.—PERNAMBUCO (Município de Exu), Escola Agrícola de Exu, 0.7 km S of Exu (4); Fazenda Batente, 5.5 km SE of Exu (2); Fazenda Pinheira, 1.5 km SW of Exu (7); Município de Exu (170).

Mus musculus (Linnaeus, 1758)

This species is another commensal. Populations are concentrated in towns, but population levels are much lower than those of *Rattus*.

Specimens collected.—PERNAMBUCO (Município de Exu) (23).

Family Caviidae

Kerodon rupestris (Wied, 1820)

This species is normally found only on lajeiros and rocky serrotes. A population was established near Parnamirim, Pernambuco, in an old quixaba forest by introducing individuals. The relatively large size (up to 1,000 g), hunting pressure, and restrictive habitat requirements have contributed to localized extirpations throughout much of the Caatingas. Reproduction is not synchronized and animals are active both day and night. This species may be the only endemic Caatinga rodent.

Specimens collected.—PERNAMBUCO (Município de Exu), Escola Agrícola de Exu, 0.7 km S of Exu (4); Fazenda Batente, 5.5 km SE of Exu (5); Fazenda Cantareno, 4.3 km NE of Exu (5); Município de Exu (9); Serrote das Lages, 17.7 km S of Exu (1); (Município de Parnamirim) (1).

Specimens examined.—ALAGOAS (Santana do Ipanema), Sítio Goiabeira (1); Sítio Lagoinha (12); Sítio Riacho do Bode (2). BAHIA (Joazeiro) (1); (Vila Nova) (2). CEARÁ (Araripe), Sítio Cachoeira (1); (Assaré), Sítio Caraco (1); Sítio Manuel Inácio (2); (Campo Sales), Sítio Acoci (18); Sítio Canto (8); (Crato), Serra do Juá (1); Sítio Boa Vista (2); (Itapagé), Sítio São João (1); (Milagres), Sítio Espinho de Judeu (2); (Missão Velho), Sítio Lapinha (2). MINAS GERAIS (Barro Alto) (1); (Riacho da Cruz) (1). PERNAMBUCO (Bodocó), Sítio Belem (2); Sítio Lopes (2); Sítio Riacho da Melancia (1); Sítio Sabonete (6); Sítio Serra do Brejo (2); (Exu), Sítio Gravatá (4); (Pesqueira), Sítio Ceguinha (1).

Galea spixii (Wagler, 1831)

This is the only rodent in the Caatingas which utilizes a network of well-worn runways. Individuals are found only in low-lying areas. Peak densities are reached in certain cultivated or recently abandoned fields. Reproduction occurs throughout the year. Activity is mostly crepuscular although short periods of activity may occur at any time.

Specimens collected.—PERNAMBUCO (Município de Exu), 0.5 km S of Exu (3); 0.5 km SW of Exu (4); 1.0 km S of Exu (5); 4.0 km S of Exu (1); Escola Agrícola de Exu, 0.7 km S of Exu (27); Fazenda Batente, 5.5 km SE of Exu (10); Fazenda Pinheira, 1.5 km SW of Exu (6); Fazenda Maniçoba, 10 km S of Exu (1); Município de Exu (106); (Município de São Lourenço da Mata), Estação Ecológica do Tapacurá (170 m) (1).

Specimens examined.—ALAGOAS (Limoeiro de Anadia), Sítio Brejo (2); Sítio Brêu

(3); Sítio Gameleira (1); (Quebrangulo), Fazenda Poço da Serra (1); Sítio Barra (1); Sítio Olho d'Água do Monteiro (2). BAHIA (Mundo Novo), Sítio Barra de Mundo Novo (1); (Serrinha), Fazenda Cruzeiro (3); Sítio Totonio (1). CEARÁ (Barbalha), Sítio São Pedro (1); (Brejo Santo), Sítio Cancela (3); Sítio Massape (1); (Crato), Sítio Fabrica (1); Sítio Miranda (1); Sítio Oiteiro (1); Sítio Sapuinho (2); (Jardim), Sítio Engenho d'Água (1); Sítio Olho d'Água (1); (Missão Velho), Sítio Yamaleira (1); (Santana do Cariri) (1); (Solonopole), Sítio Cedrão (1); Sítio Inhuma (1); Sítio Passa Corrente (1); Sítio Veneza (4). PERNAMBUCO (Exu), Sítio Alto do Umbuzeiro (1); Sítio Gravatá (1); (Bodocó), Sítio Roncador (3); (Pesqueira), Fazenda Caçimba Nova (1); Fazenda Caianinha (1); Sítio Carrapato (1); Sítio Isabel Dias (1); Sítio Maravilha (2); Fazenda Pitanquinha (6); Fazenda Quatro Cantos (1); Sítio Serrinha (1); (Triunfo), Sítio Lagoa do Almeida (1).

Family Dasyproctidae

Dasyprocta prymnolopha (Wagler, 1831b)

Heavy hunting pressure has greatly reduced or eliminated populations in many localities. Remnant populations still persist in some pockets of Caatinga Alta and on isolated serrotes. In areas subject to minimal hunting pressure, such as the Floresta Nacional Araripe-Apodí, these large rodents may still be common residents.

Specimens collected.—PERNAMBUCO (Município de Exu), Fazenda Marçal, 14.2 km NW of Exu (2).

Specimen examined.—PERNAMBUCO (Dois Irmãos) (1).

Family Echimyidae

Thrichomys apereoides Lund, 1841 (see Petter, 1973)

This echimyid is strictly associated with rocky habitats, such as serrotes and lajeiros. Reproductive periods are relatively synchronized and the young are very precocial. *Thrichomys* may be active for brief periods at any time but it is generally crepuscular. These animals are scansorial and are good climbers.

Specimens collected.—BAHIA (Município de Senhor do Bom Fim), Fazenda Flamengo, 10 km N of Jaguarari (3); Fazenda Morro da Imburana, 15 km N of Jaguarari (2). PERNAMBUCO (Município de Exu), Escola Agrícola de Exu, 0.7 km S of Exu (25); Fazenda Batente, 5.5 km SE of Exu (13); Fazenda Guarani, 2.9 km N of Exu (5); Fazenda Pinheira, 1.5 km SW of Exu (4); Fazenda Santa Helena, 1 km N of Exu (2); Município de Exu (48); (Município de São Lourenço da Mata), Estação Ecológico do Tapacurá (170 m) (3).

Order Carnivora

Family Canidae

Cerdocyon thous (Linnaeus, 1766)

This species is ubiquitous and fairly common. Currently, *Cerdocyon* is the most abundant terrestrial predator (placental) in the Caatingas and on the Chapada do Araripe.

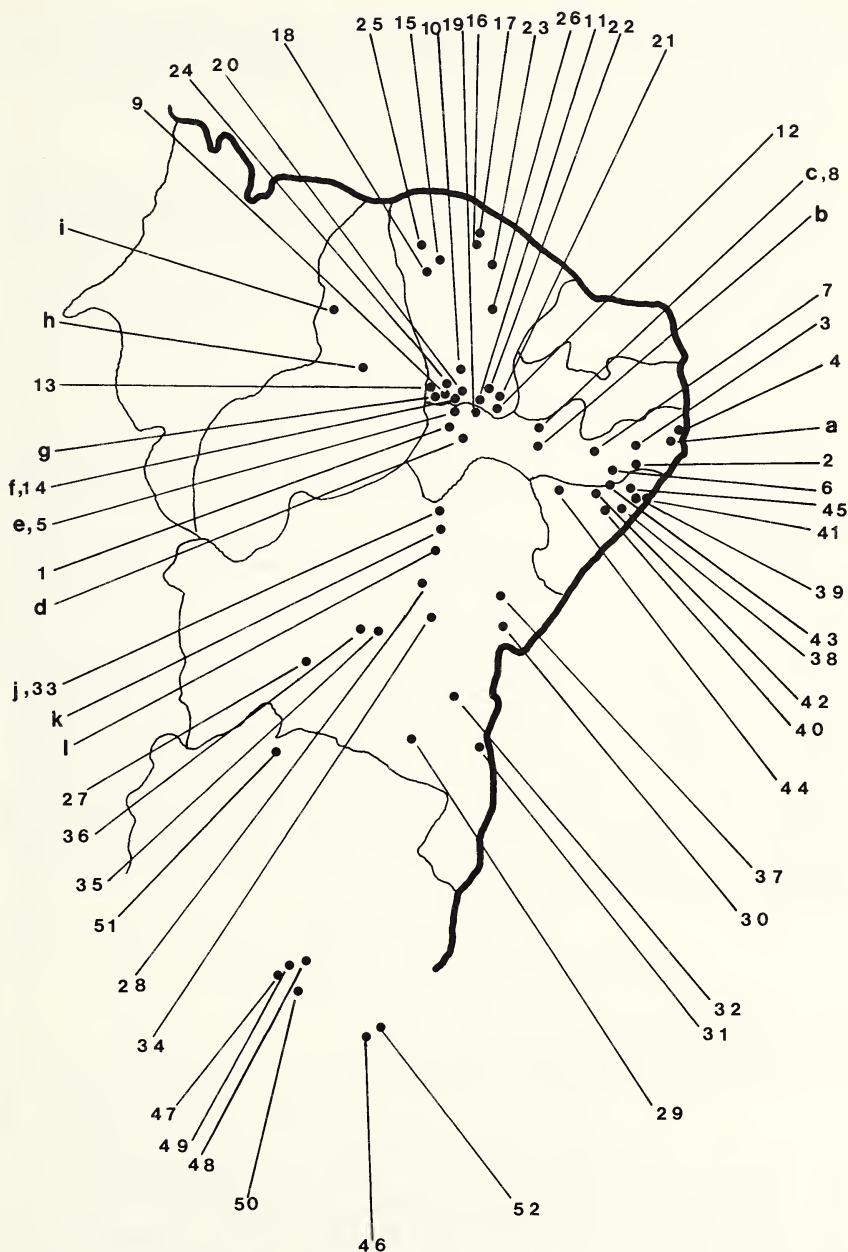


Fig. 15.—Mammal specimens were examined or collected from a broad area throughout most of the Northeast of Brazil. Major localities are indicated by a dot, with the appropriate numeral referencing the set of specific sites enumerated in the Gazetteer.

Specimens collected.—CEARÁ (Município de Crato), Floresta Nacional Araripe-Apodí, 9 km W of Crato (1). PERNAMBUCO (Município de Exu), Escola Agrícola de Exu (1); (Município de Serra Talhada), Município de Serra Talhada (1).

Family Mustelidae

Galictis vittata (Schreber, 1776)

Highest densities are apparently reached in rocky areas. This species is probably the most important mammalian predator of the rock-dwelling rodents *Kerodon* and *Thrichomys*.

Specimens collected.—PERNAMBUCO (Município de Exu), Fazenda Batente, 5.5 km SE of Exu (2).

Family Felidae

Felis yagouaroundi (E. Geoffroy, 1803)

Areas currently disturbed by man's activities are usually not frequented by this species. It may occur in any of a variety of Caatingas and Chapada habitats.

Specimen collected.—PERNAMBUCO (Município de Exu), Escola Agrícola de Exu (1).

GAZETTEER

All sites in the Gazetteer are represented by an alphanumeric code and are organized by municipality and state separately for specimens collected and specimens examined. For collected specimens, each site is indexed by a letter (A through L) followed by a number. The letter refers to a general locality (that is, a municipality), while the number refers to a distinct site within the locality. For specimens examined, each site represented is indexed by a number (1–52) followed by a letter. The number refers to a general locality written on the museum tags (presumably a municipality or city), while the letter refers to distinct sites within the locality. Sites may be located on the map in Fig. 15 by referring to the general locality index (the letter for specimens collected, the number for specimens examined).

Specimens Collected

Município de São Lourenço da Mata Pernambuco

- A1 Mata do Camocim (170 m)
- A2 Estação Ecológico do Tapacurá (170 m)

Município de Serra Talhada Pernambuco

- B1 Fazenda Saco (I.B.A.), 6.6 km NNE of Serra Talhada
- C1 Fazenda Salto, 35 km NNE of Serra Talhada
- C2 SUCAM (in the town of Triunfo), 28 km NNE of Serra Talhada

Município de Parnamirim
Pernambuco

D1 Town of Parnamirim, 47.6 km W of Salgueiro

Município de Exu
Pernambuco

- E1 Açude Itamaragí, .5 km S of Exu
- E2 Escola Agrícola de Exu, .7 km S of Exu
- E3 Fazenda Alto de Ferreira, 5.0 km SW of Exu
- E4 Fazenda Alto do Umbuzeiro, 1.4 km NW of Exu
- E5 Fazenda Barracão, 19.8 km SW of Exu
- E6 Fazenda Batente, 5.5 km SE of Exu
- E7 Fazenda Bom Jesus, .8 km NNW of Exu
- E8 Fazenda Cachoeira, 13.1 km SSW of Exu
- E9 Fazenda Cana Mansa, 13.4 km SW of Exu
- E10 Fazenda Cantareno, 4.5 km NNE of Exu
- E11 Fazenda Colônia, 5.5 km S of Exu
- E12 Fazenda Gravatá, 3.1 km NW of Exu
- E13 Fazenda Guaraní, 2.9 km N of Exu
- E14 Fazenda Marçal, 10.5 km NW of Exu
- E15 Fazenda Manicoba, 13.7 km SSW of Exu
- E16 Fazenda Pau Ferrado, 2.6 km E of Exu
- E17 Fazenda Paus Grandes, 14.2 km E of Exu
- E18 Fazenda Pinheira, 1.5 km SW of Exu
- E19 Fazenda Pomonha, 21 km SSW of Exu
- E20 Fazenda São José, 1.5 km N of Exu
- E21 Fazenda São Pedro, 1 km ESE of Exu
- E22 Fazenda Santa Helena, 1 km NE of Exu
- E23 Fazenda Uruguai, 4.8 km NE of Exu
- E24 Serrote das Lajes, 17.0 km S of Exu
- E25 Serrote das Lajes, 17.7 km S of Exu
- E26 Serrote Gambá, 19 km SSW of Exu
- E27 Serrote Gritadeira, 18 km SSW of Exu

Município de Crato
Ceará

- F1 Aeroporto de Crato, 10 km SW of Crato
- F2 Colégio Agrícola de Crato, 5 km W of Crato
- F3 Fazenda Fundão, 3 km SSW of Crato
- F4 Floresta Nacional Araripe-Apodí, 8 km S of Crato
- F5 Floresta Nacional Araripe-Apodí, 9 km S of Crato
- F6 Floresta Nacional Araripe-Apodí, 8 km SSW of Crato
- F7 Floresta Nacional Araripe-Apodí, 10 km SSW of Crato

- F8 Floresta Nacional Araripe-Apodí, 11 km SSW of Crato
F9 Floresta Nacional Araripe-Apodí, 13 km SSW of Crato
F10 Floresta Nacional Araripe-Apodí, 17 km SSW of Crato
F11 Floresta Nacional Araripe-Apodí, 21 km SSW of Crato
F12 Floresta Nacional Araripe-Apodí, 9 km SW of Crato
F13 Floresta Nacional Araripe-Apodí, 10 km SW of Crato
F14 Floresta Nacional Araripe-Apodí, 11 km SW of Crato
F15 Floresta Nacional Araripe-Apodí, 14 km SW of Crato
F16 Floresta Nacional Araripe-Apodí, 19 km SW of Crato
F17 Floresta Nacional Araripe-Apodí, 9 km W of Crato
F18 Floresta Nacional Araripe-Apodí, 10 km W of Crato
F19 Sítio Luanda (Itaiteira), 4 km S of Crato

Município de Nova Olinda
Ceará

- G1 Km 19 on Route CE 96 (outside of the town of Nova Olinda)

Município de Valença do Piauí
Piauí

- H1 Fazenda Olho da Agua, 2 km N of Valença do Piauí
H2 (Watering Hole) 5 km W of Valença do Piauí

Município de Teresina
Piauí

- I1 Km 18 on Route BR 316 (outside of the city of Teresina)

Município de Juazeiro da Bahia
Bahia

- J1 Fazenda Barrinha
J2 Fazenda São Raimundo, Km 216 on Route BA 130

Município de Senhor do Bonfim
Bahia

- K1 Fazenda Flamengo, Km 150 on Route BA 130, 10 km N of the town of Jaguarari
K2 Fazenda Lajeido, Km 147 on Route BA 130
K3 Fazenda Morro da Imburana, Km 145 on Route BA 130
L1 Distrito de Juacema (on Route BA 130)

Specimens Examined

(National Museum in Rio de Janeiro)
Bodocó

Pernambuco

- 1a Sítio Belem
1b Sítio Lopes

- 1c Sítio Paus Pretio
- 1d Sítio Riacho da Melanção
- 1e Sítio Roncador
- 1f Sítio São Gonçalo
- 1g Sítio Sabonete
- 1h Sítio Serra do Brejo
- 1i Sítio Xique-xique

Bonito
Pernambuco

- 2a Sítio Rodiadouro

Caruaru
Pernambuco

- 3a Sítio Brejinha de Serra dos Cavalos
- 3b Sítio Brejo do Buraco
- 3c Sítio Canhoto
- 3d Sítio Capoeira
- 3e Fazenda Caruaru
- 3f Sítio Gravatá
- 3g Pingueiras
- 3h Sítio Pitombeira
- 3i Sítio Preguica
- 3j Sítio Quandús
- 3k Sítio Riacho dos Mocós
- 3l Sítio Roncaria
- 3m Fazenda Salgado
- 3n Fazenda Santa Maria
- 3o Sítio Serra dos Cavalos
- 3p Fazenda Serraria
- 3q No locality

Dois Irmãos
Pernambuco

- 4a No locality

Exu
Pernambuco

- 5a Sítio Gravatá
- 5b Sítio Alto do Umbuzeiro

Garanhuns
Pernambuco

- 6a Sítio Brejo Grande
- 6b Sítio Cajarana

- 6c Fazenda Caldeirão
- 6d Sítio Camaratuba
- 6e Sítio Canhoto
- 6f Sítio Capim
- 6g Sítio Cavaquinho
- 6h Fazenda Colônia da Serra
- 6i Fazenda Cristovão
- 6j Sítio Engenho do Manião
- 6k Sítio Flamengo
- 6l Sítio Frixeira
- 6m Sítio Inhumas
- 6n Sítio Jambelo
- 6o Sítio Lajeiro
- 6p Sítio Laranja
- 6q Sítio Riacho Fundo
- 6r Sítio Riacho Seco
- 6s Sítio Saco
- 6t Fazenda São Paulo
- 6u Fazenda Serra da Pedra
- 6v Fazenda Trairas
- 6w Sítio Varzea do Ingá
- 6x Sítio Varzea-Ingá
- 6y Sítio Varzea-Redonda
- 6z Fazenda Velha
- 6aa No locality

No Area
Pernambuco

No locality

Pesqueira
Pernambuco

- 7a Fazenda Caçimba Nova
- 7b Fazenda Caianinha
- 7c Sítio Carrapato
- 7d Sítio Isabel Dias
- 7e Sítio Maravilha
- 7f Fazenda Pitanquinha
- 7g Fazenda Quatro Cantos
- 7h Sítio Serrinha
- 7i Fazenda Sororoca

Triunfo
Pernambuco

- 8a Sítio Boa Esperança de Jérico
- 8b Sítio Borgens

- 8c Sítio Brejinho
8d Sítio Cana Brava de Jérico
8e Sítio Corredor do Vento
8f Sítio Lagoa do Almeida
8g Sítio Macaco de Baixa Verde
8h Sítio Monte Alegre
8i Sítio Novo
8j Sítio Oiti
8k Sítio Peri-peri
8l Sítio Salva Terra
8m Sítio São Bartolomeu
8n Sítio São Mateus
- Araripe
Ceará
- 9a Sítio Cachoeira
- Assare
Ceará
- 10a Sítio Caraco
10b Sítio Manuel Inacio
- Barbalha
Ceará
- 11a Sítio Barreiras
11b Sítio São Pedro
11c Sítio Tupinamba
- Brejo Santo
Ceará
- 12a Sítio Cancela
12b Sítio Massape
- Campo Sales
Ceará
- 13a Sítio Acoci
13b Sítio Canto(s)
13c Sítio Volta
- Crato
Ceará
- 14a Sítio Arisco
14b Sítio Belo Horizonte
14c Sítio Boa Vista
14d Sítio Caiano
14e Chapada Araripe
14f Sítio Constantino

- 14g Sítio Crispin
- 14h Sítio Fabrica
- 14i Sítio Grangeiro
- 14j Sítio Miranda
- 14k Sítio Oiteiro
- 14l Sítio Olaria
- 14m Sítio Parque
- 14n Sítio Passagem
- 14o Sítio Sapinho
- 14p Serra do Juá
- 14q No locality

Guaraciaba
Ceará

- 15a Sítio Mazagão

Itapagé
Ceará

- 16a Sítio Bom Jesus
- 16b Camará
- 16c Sítio Maia
- 16d Sítio São João II
- 16e Sítio São José
- 16f Sítio Trata

Itapipoca
Ceará

- 17a Sítio Jacú

Ipíu
Ceará

- 18a Cidade de Ipíu
- 18b Sítio Gagas
- 18c Fazenda Lages
- 18d Sítio Pereiros

Jardim
Ceará

- 19a Sítio Cereado
- 19b Sítio Engenho d'Água
- 19c Sítio Olho d'Água

Joazeiro
Ceará

- 20a Sítio Boca das Cobras

Milagres
Ceará

- 21a Sítio Camará
21b Sítio Espinho de Judeu

Missão Velho
Ceará

- 22a Sítio Açude Velho
22b Sítio Araruna
22c Sítio Cachoeira
22d Sítio Emboscada
22e Sítio Lapinha
22f Sítio Yamaleira

Pacoti
Ceará

- 23a Sítio Alvoredo
23b Sítio Baixa Verde
23c Sítio Boa Esperança do Lapis
23d Sítio Boa Vista
23e Sítio Coati
23f Sítio Espinho Vermelho
23g Sítio Flor
23h Sítio Goiabeira
23i Sítio Ladeira
23j Sítio Lorena
23k Sítio Mendoza
23l Sítio Ouro
23m Sítio Umquaiana

Santana do Cariri
Ceará

- 24a Cidade de Santana do Cariri

São Benedito
Ceará

- 25a Sítio Alto
25b Sítio Barra
25c Sítio Barros
25d Sítio Cantinho
25e Sítio Carangueijo
25f Sítio Catinginha
25g Sítio Cegarro
25h Sítio Chora

- 25i Sítio Cinta da Solidade
- 25j Sítio Guaribas do Amaral
- 25k Sítio Macapá
- 25l Sítio Muricatuba
- 25m Sítio Pedra de Côco
- 25n Sítio Piraguará
- 25o Sítio São José da Boa Vista

Solonopole
Ceará

- 26a Sítio Cedrão
- 26b Sítio Inhuma
- 26c Sítio Passa Corrente
- 26d Sítio Veneza

Bom Jesus de Lapa
Bahia

- 27a Ilha do Medo

Campo Formosa
Bahia

- 28a Fazenda Rapousa

Conquista
Bahia

- 29a Fazenda Agrião
- 29b Fazenda Barra Morangoa
- 29c Sítio Batalha
- 29d Fazenda Espirito Santo
- 29e Fazenda Felícia

Feira
Bahia

- 30a Fazenda Capoeira do Rosario
- 30b Fazenda Cazumba
- 30c Fazenda Jacú
- 30d Fazenda Salgado
- 30e Fazenda Tanque do Pasto
- 30f Sítio Tomba
- 30g Fazenda Três Riachos

Ilheus
Bahia

- 31a Aritaque Urucutuca
- 31b Banco da Vitória, Pirataquissé

- 31c Buerarema Riberão da Fortuna
31d Rio do Braço, Fazenda Almeida
Jequié
Bahia
- 32a Fazenda Pedra Redonda
32b Fazenda Santa Maria
Joazeiro
Bahia
- 33a No locality
Mundo Novo
Bahia
- 34a Sítio Barra de Mundo Novo
No Area
Bahia
No locality
Palmeiras
Bahia
- 35a Sítio Bouqueirão
35b Campo de São José
35c Fazenda Conceição
Seabra
Bahia
- 36a Varzea da Canabrava
36b Fazenda Cochó do Malheiros
36c Fazenda Furados
36d Lagoa Seca
Serrinha
Bahia
- 37a Fazenda Alagadiço Grande
37b Sítio Baixa d'Água
37c Fazenda Cacuá
37d Fazenda Bruzeiro
37e Fazenda Europa
37f Fazenda João Congo
37g Fazenda Montanha
37h Fazenda Oiteiro
37i Fazenda Riacho Grande
37j Fazenda Tiririca

37k Sítio Totonio

37l Fazenda Umburana

Vila Nova
Bahia

No locality

Anadia
Alagoas

38a Sítio Brejo do Boi

Capela
Alagoas

39a Fazenda Serra Alegre

Limoeira de Anadia
Alagoas

40a Sítio Barracão

40b Sítio Brejo

40c Sítio Brêu

40d Sítio Gameleira

Managabeiras (= Manguaba)
Alagoas

41a Usina Sinimbu

Palmeiras dos Índios
Alagoas

42a Sítio Capuma

42b Sítio Dormião

42c Sítio Panelas

42d Sítio Ribeira

42e Sítio Sabiá

Quebrangulo
Alagoas

43a Sítio Barra

43b Sítio Barra Preto

43c Fazenda Bento de Barros

43d Fazenda Dourado

43e Engenho Juliana

43f Engenho Riachão

43g Fazenda Lagoa dos Bois

43h Sítio Mauras

43i Sítio Olho d'Água do Monteiro

- 43j Fazenda Peri-peri
43k Fazenda Poço da Serra
43l Fazenda Santa Cruz II

Santana do Ipanema
Alagoas

- 44a Sítio Goiabeira
44b Sítio Lagoinha
44c Sítio Riacho do Bode

Viçosa
Alagoas

- 45a Sítio Amazonas
45b Sítio Bauauas
45c Sítio Cachoeira Grande
45d Sítio Cambuim II
45e Sítio Canárias
45f Sítio Estrada Nova
45g Sítio Engenho São José
45h Fazenda Gitirana
45i Sítio Gravatá
45j Sítio Pedra da Fazenda das Pereiras
45k Fazenda Pedra do Fogo
45l Fazenda Pindobinha
45m Fazenda Poço Feio
45n Fazenda Riachão II
45o Sítio São José
45p Fazenda São Manoel
45q Fazenda São Pedro
45r Sítio Tamanduá
45s Sítio Tangil
45t Sítio Tangil 2°
45u Sítio Timbó 2°
45v Sítio Urucuba
45w Sítio Vila Maria Lia

Alem Paraiba
Minas Gerais

- 46a Fazenda São Geraldo

Barro Alto
Minas Gerais

No locality

Belo Horizonte
Minas Gerais

- 47a Bairro Gameleira
47b Secção Fornecimento Agrícola

Conceição do Mato Dentro
Minas Gerais

- 48a Boca da Mata
48b Bocada Mulata
48c Mata do Dr. Daniel

Jaboticabas (=Jaboticatubas?)
Minas Gerais

- 49a No locality

Ouro Preto
Minas Gerais

- 50a No locality

Riacho da Cruz
Minas Gerais

- 51a No locality

Santa
Minas Gerais

Bicas Lagoa

Volta Grande
Minas Gerais

- 52a Fazenda Paraíso
52b Fazenda Pombal

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